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## Worldwide Report

# TELECOMMUNICATIONS POLICY, RESEARCH, AND DEVELOPMENT

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20 OCTOBER 1986

WORLDWIDE REPORT  
TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

CONTENTS

ASIA

HONG KONG

Local TV Station Preparing for Satellite Reception (Shirley Hui, Peter Loke; Hong Kong HONGKONG STANDARD, 18 Aug 86) .....	1
Need for Review of Communications Rules Stressed (Hong Kong HONGKONG STANDARD, 26 Aug 86) .....	2

VIETNAM

Briefs Phu Khanh Transmitter	3
---------------------------------	---

EAST EUROPE

HUNGARY

Capacity of Satellite Transponders in Homogeneous SCPC Systems (Gyorgy Pribelszky; Budapest HIRADASTECHNIKA, No 3, 1986)	4
---	---

POLAND

Telecommunications Regulatory Legislation (Warsaw MONITOR POLSKI, No 18, 1 Jul 86; Warsaw DZIENNIK USTAW, No 25, 1 Jul 86) .....	16
Equipment, Line Registration Procedures	16
High Frequency Emitting Devices	19
Line Network Use Rules	20

## LATIN AMERICA

### ARGENTINA

Clandestine Broadcasting Stations Reportedly Increasing (Andrea Rodriguez; Buenos Aires TIEMPO ARGENTINO, 16 Aug 86)	24
Briefs	
New Communications Network	26
Delta Region Communications	26

### BRAZIL

Briefs	
New Embratel Service	27
Telephone, Telex Fees Reduced	27
Telephone Expansion Plan	27

### CUBA

TV Broadcasts Overseas Via Soviet Satellite Underway (Gustavo Robreno; Havana GRANMA, 24 Jul 86) .....	28
---	----

### JAMAICA

Briefs	
Trans-Caribbean Cable	30
Broadcasting Board Appointments	30

## NEAR EAST/SOUTH ASIA

### REGIONAL AFFAIRS

Briefs	
Jordan, Syria Microwave Talks	31

### AFGHANISTAN

Briefs	
New Radio Station	32

### INDIA

Telecom Services May Suffer From Budget Shortage (New Delhi PATRIOT, 29 Aug 86) .....	33
--	----

### JORDAN

Telecommunications Corporation To Be Completely Privatized (Rana Sabbagh; Amman JORDAN TIMES, 30 Aug 86) .....	34
---	----

## UNITED ARAB EMIRATES

New Telecommunications Cable Laid To Link With Pakistan (M. A. Qudoos; Dubayy KHALEEJ TIMES, 3 Sep 86) .....	36
---	----

## SUB-SAHARAN AFRICA

### ZIMBABWE

Transmitter Operating To Mask RSA Broadcasts (Johannesburg SAPA, 23 Sep 86) .....	39
--	----

## WEST EUROPE

### EUROPEAN AFFAIRS

Luxembourg, France Compete Over ASTRA, TDF-1 Satellites (Paris LE MONDE, 24 Jun 86; Paris AFP SCIENCES, 26 Jun 86)	40
Background on ASTRA, TDF-1	40
Technical Aspects	42

### CYPRUS

Briefs	
Radio Cooperation With Greece	44

### FRANCE

Briefs	
Matra, Nokia Sign Agreement	45
Eutelsat Coverage Enlarged	45

### ITALY

Europe Views Future of Continental Telecommunications Systems (Turin MEDIA DUEMILA, No 7, Jul-Aug 86) .....	46
Italsat, Experimental Olympus Projects, by Luigi Granelly	46
Problems for French Tdfl, by Antonella Tarquini	49
Olympus, 'Sarit' Programs, by Giorgio Bogi	54

### SPAIN

New Law Reportedly To Liberalize Telecommunication Services (Jose F. Beaumont; Madrid EL PAIS, 10 Sep 86) .....	61
Telefonica Issues Conditions for ITT, CGE Project (Pedro Cases; Madrid EL PAIS, 4 Sep 86) .....	63

TURKEY

Telephone Lines Expanded in Istanbul (Istanbul MILLIYET, 4 Jul 86) .....	65
Briefs	
Second Channel Broadcast in October	66
ATT-Philips To Supply Coaxial Cable	66
New Automatic Telephone Exchanges	66

/7310

## LOCAL TV STATION PREPARING FOR SATELLITE RECEPTION

Hong Kong HONGKONG STANDARD in English 18 Aug 86 p 1

[Article by Shirley Hui and Peter Loke]

[Text]

**RUSSIAN** television programmes beamed off Soviet satellites may soon be flashing on local TV screens.

Asia Television has just bought its own satellite dish, manufactured in Shanghai, which will be able to receive overseas satellite transmissions, including those of the Soviet Union.

However, there are several formalities the station will have to straighten out before it can broadcast any programmes received on the dish.

At present, privately received programmes cannot be re-broadcast without clearance from Cable and Wireless, Hongkong.

The question is whether programmes beamed off Soviet satellites are covered under international agreements.

Meanwhile, ATV said it bought the dish to explore the benefits of the latest technology.

The Chief Engineer of ATV, Mr Lam Sai-cheong, confirmed a report by the China News Service that they had ordered a 5-metre

satellite dish from Shanghai.

It is due to arrive soon.

With it, the station will be able to receive satellite TV broadcasts from Beijing, the Soviet Union and possibly a few other countries.

Television Broadcasts (HKTVB) is also reportedly negotiating with the same company in Shanghai for the same kind of satellite dish, although this could not be confirmed.

If all legal problems are sorted out and the satellite signals are good enough for re-broadcast, ATV audiences may look forward to a wider choice of international fare.

But Mr Lam said yesterday it is too early to talk about future viewing.

He wouldn't say if the move is part of the station's preparations to compete with the cable television service which plans to include satellite programmes.

"As technicians, we must move ahead of the times. Satellite technology is something we in the broadcasting industry must know about," Mr Lam said.

Cable and Wireless holds an exclusive licence to provide external television services to and from Hongkong through its huge station in Stanley.

ATV will have to make the appropriate arrangements if it is to televise programmes off its dish.

"We aren't even sure whether the signals we'll receive on our small dish will be good enough for re-broadcast," Mr Lam said.

"Unlike other countries, we don't have our own overhead satellites, and the signals are quite weak when they reach us," he said.

But it is technically possible to re-broadcast satellite TV programmes picked up on a 5-metre dish, he added.

At present, the two TV stations pay Cable and Wireless for live satellite broadcasts of football matches and other world events. The daily news programmes also arrive this way.

With the installation of its own satellite dish, ATV will be able to receive direct broadcasts — including news — from overseas.

## NEED FOR REVIEW OF COMMUNICATIONS RULES STRESSED

Hong Kong HONGKONG STANDARD in English 26 Aug 86 p 4

[Text]

A UNIVERSITY lecturer has called for an overall review of existing Government policies regarding communication and information industries here.

Dr Kenneth Leung, a lecturer at the Department of Journalism and Communication at the Chinese University, said there is no coherent policy

which can provide guidelines for the overall communication development of the territory.

"The review is urgently needed because the information age is coming," Dr Leung noted.

Dr Leung said the media emerging in the information age are all closely related and can hardly be regulated separately.

"For example, cable television is able to perform information services like electronic publishing and home banking, not just

the role of entertaining," he said.

There is a question as to whether the same restrictions applied to the publishing industry now should be extended to cover electronic publishing, or whether the set of restrictions for television should be used instead.

"The problem herein is that the media in the new age will not just exist by itself. It is converging on advanced communication technology," Dr Leung said.

Therefore, the line separating individual media will be less clear and policies which are tailored for each particular medium will become a problem.

"Copyrights are one of the issues which need to be solved when electronic publishing enters the scene," Dr Leung said.

"As a matter of fact, the nature of the new communication technologies, like direct broadcasting satellites, is fundamentally different from conventional ones, such as television and newspapers," he remarked.

"Therefore, the concept used for regulating the conventional media should not be simply transplanted to fit the new media."

In addition, he suggested the Government start educating the public on the implications and significance of the coming information age.

/6091

CSO: 5550/0002

VIETNAM

BRIEFS

PHU KHANH TRANSMITTER--The Phu Khanh provincial post and telegraph office on 16 September completed the construction of a 1-kw mediumwave transmitter for communication purposes in coastal areas. This is a project that was designed and built by technical cadres and workers of the telegraph station. [Summary] [Hanoi Domestic Service in Vietnamese 1100 GMT 17 Sep 86 BK] /8309

CSO: 5500/4301

# CAPACITY OF SATELLITE TRANSPONDERS IN HOMOGENEOUS SCPC SYSTEMS

Budapest HIRADASTECHNIKA in Hungarian No 3, 1986 pp 115-121

[Article by Gyorgy Pribelszky, Telecommunications Research Institute: "Channel Capacity of Artificial Satellite Retranslator in Homogeneous SCPC Systems"]

## [Text] Summary

The article reviews the determination of the channel capacity of power limited satellite retranslators used to forward SCPC-FDMA carrier waves and possible ways to increase channel capacity in artificial satellite homogeneous telephone networks. It discusses the digital signal processing and signal forwarding methods planned for the "Intercsat" telephone channel generating equipment, but the methods developed and the results obtained can also be used in the case of other signal processing-signal forwarding methods.

## 1. Introduction

Those satellite telephone networks in which the average channel capacity of each ground station is 12 duplex channels or less are called medium or small traffic satellite telephone networks. It is an additional characteristic of these satellite telephone networks that many ground stations (50-60 on the basis of present practice) are connected to the satellite retranslator. It must be noted that in satellite telephone networks of this type there can also be a ground station--usually the node station of the network--which has a capacity substantially greater than 12 duplex telephone channels (50-60 on the basis of practice thus far).

In these satellite telephone networks the optimal solution from the viewpoint of simultaneous maximal exploitation of the transmitter power and band width available to the satellite retranslator and of maximal flexibility of access by the several ground stations is represented by use of individual speech channel (SCPC) systems. In SCPC systems the signal of every single telephone channel modulates a different carrier wave (thus the name) and the satellite retranslator bundles the radio signals of the ground stations on the principle of frequency division (SCPC-FDMA systems). Other publications deal with use of SCPC systems in satellite telephone networks (1) and with a terse summary of the channel capacity problems of satellite retranslators forwarding SCPC carrier waves (5).

## 2. Channel Capacity of Satellite Retranslator in the Case of Various Signal Processing-Signal Forwarding Methods

Both analog and digital signal processing-signal forwarding methods are suitable for creation of SCPC-FDMA systems. At the present time the signal processing-signal forwarding methods widely used in SCPC systems are the following: 1. analog frequency modulation (FM) using optimal margin phase and syllable compression and a reduced threshold demodulator; 2. digital transconductance controlled adaptive delta modulation, with two or four state digital differential phase modulation, with a signal forwarding speed of 32 K bits or 64 K bits per second and with coherent detection (DCADM-DBPSK or DCADM-DQPSK), and 3. pulse code modulation using seven bit code words, with four state digital phase modulation, with a signal forwarding speed of 64 K bits per second and with coherent detection (PCM-QPSK). In the "Intercsat" telephone channel generating equipment being developed at the Telecommunications Research Institute it is planned to use the PCM-QPSK and DCADM-DBPSK system, so here we will examine only these from the viewpoint of the channel capacity which can be realized in a satellite retranslator with the given parameters.

We call an SCPC system homogeneous if the quality factors-- $G/T$  values--of the ground stations linked to the same satellite retranslator are the same, if the signal processing-signal forwarding methods are the same for every carrier wave and the frequency distances between carrier waves are the same (the carrier wave division is even).

From the viewpoint of channel capacity the most important parameters of satellite retranslators forwarding SCPC signals with several carrier waves are: the effective on-board transmitter power transmitted isotropically ( $EIRP_s$ ), the quality factor ( $G/T_s$ ) of the on-board receiving equipment, the bandwidth of the satellite retranslator (at most 36 MHz in the case of satellite communications systems operating in the 6/4 GHz frequency range), the frequency stability of the on-board 6/4 GHz slide oscillator, and the AM-AM compression and AM-PM conversion of the on-board travelling wave amplifier. In multiple carrier wave access operation the working point of the non-linear satellite retranslator must be selected in such a way that the interference level between carrier waves is minimal even in the case of maximum load.

The bandwidth efficiency is an important system parameter of any communications system, including artificial satellite communications systems. The definition of bandwidth efficiency is the number of those information bits which can be forwarded by the bandwidth used within one cycle. Bandwidth efficiency reaches its maximum value at channel capacity, because in the case of a given bandwidth the information speed is maximal in this case. In a memory-free Gauss channel, if the bandwidth is  $B$ , the maximum bandwidth efficiency can be determined by the following interdependency:

$$C/B = \log_2 \left( 1 + \frac{P}{N_0 B} \right)$$

$$= \log_2 [1 + (E_b/N_0) (C/B)] \quad (1)$$

where C is the channel capacity, B is the bandwidth of the channel, P is the received signal power,  $N_0$  is the noise density and  $E_b$  is the bit energy.

The  $E_b/N_0$  from interdependency (1) can be expressed in the following way:

$$E_b/N_0 = \frac{1}{(C/B)} [2^{C/B} - 1]. \quad (2)$$

If C/B is smaller than 2 then the channel is band limited, if C/B is greater than 2 then the channel is power limited. The channel capacity can be attained in both band limited and power limited channels, if we select the coding-modulation/demodulation-decoding system appropriately. It must be noted that the Shannon capacity theory determines the maximal speed at which information can be forwarded reliably but it does not provide a guide as to how one should design a practical coding/decoding system with which the channel capacity defined by the theory can be realized.

Table 1. Carrier Wave Forwarding Capacity of a Band Limited Satellite Retranslator

B MHz: \ delta f kHz:	45	80
34	754	424
36	800	450

B: bandwidth of satellite retranslator

delta f: frequency distance between carrier waves

## 2.1 Channel Capacity of Band Limited Retranslator

In SCPC-FDMA systems we call a satellite retranslator band limited if the bandwidth of the satellite retranslator determines or limits the carrier wave forwarding capacity.

Figure 1 illustrates the theoretical outline of the frequency plan of a satellite retranslator forwarding SCPC-FDMA carrier waves, in the case of an even carrier frequency division and equal level carrier waves (homogeneous SCPC system). Since the bandwidth of the satellite retranslators serving to forward the SCPC-FDMA carrier waves is given the frequency distance between carrier waves and thus the number of carrier waves which can be forwarded in a band limited satellite retranslator are determined by the spectrum width of the modulated carrier waves, or by the modulation method chosen. In the "Intercsat" telephone channel generating equipment 45 kHz and 80 kHz are prescribed for the frequency distance between carrier waves.

In the case of an even carrier frequency distribution the number of carrier waves which can be forwarded in a band limited satellite retranslator can be determined from the following interdependency:

$$2N = \frac{B^{\text{MHz}}}{\Delta f^{\text{kHz}}} 10^3 \quad (3)$$

where  $2N$  is the number of carrier waves which can be forwarded,  $N$  is the number of duplex telephone channels which can be forwarded,  $B$  is the bandwidth of the satellite retranslator and  $\Delta f$  is the frequency distance between neighboring carrier waves.

Table 1 summarizes the carrier wave forwarding capacity for a band limited satellite retranslator in the cases of a retranslator band width of 34 MHz and 36 MHz and a frequency distance between carrier waves of 45 kHz and 80 kHz.

## 2.2 Channel Capacity of a Power Limited Retranslator

We call a satellite retranslator forwarding SCPC-FDMA carrier waves power limited if the output power available to the retranslator determines, or limits, the carrier wave forwarding capacity and the bandwidth available to the retranslator would make possible the forwarding of a larger number of carrier waves than permitted by the output power. At the present time the larger number of satellite retranslators serving to set up telephone links are power limited.

The channel capacity of a satellite retranslator is determined by the difference between the power available and the threshold value carrier/noise density power relationship:

$$10 \log_{10} (2N) = (C/N_0)_{\text{UDI}} - (C/N_0)_K \text{ dB} \quad (4)$$

where:

$$(C/N_0)_{\text{UDI}} = [(C/N_0)_U^{-1} + (C/N_0)_D^{-1} + (C/N_0)_I^{-1}]^{-1} \quad (5)$$

$2N$  is the number of carrier waves which can be forwarded,  $C$  is the power of the carrier wave,  $N_0$  is the noise power density, the  $U$  index indicates the upgoing section (Earth to satellite), the  $D$  index indicates the downgoing section (satellite to Earth), the  $I$  index indicates the intermodulation between carrier waves, the  $K$  index indicates the threshold value and the  $UDI$  index indicates the resultant of the carrier/thermic noise relationship of the upgoing section and the downgoing section and the carrier/intermodulation noise relationship. The summing in interdependency (5) must be done in relative numbers and not in decibels.

In the case of retranslator type on-board repeater stations the thermic noise of the upgoing section and of the downgoing section are not uncorrelated so the thermic noise of the upgoing section cannot be ignored. If the intermodulation noise has a perturbation character then the thermic noise and the intermodulation noise are power additive.

Satellite retranslators with multiple carrier wave access cannot be operated in a single carrier wave access saturation range. So in multiple carrier wave access operation one must select (optimize) the working point of the nonlinear satellite retranslator so that even in the event of maximum load it will operate in the linear range. As a consequence of this there are losses in both input and output power ( $BO_i$  and  $BO_o$ ). Taking this into consideration the optimal effective isotropically transmitted power belonging to the access working point of several carrier waves is:

$$(EIRP)_S = (EIRP)_{ST} - BO_o \quad \text{dBW} \quad (6)$$

where  $(EIRP)_S$  is the on-board power belonging to the optimal working point,  $(EIRP)_{ST}$  is the on-board saturation power and  $BO_o$  is the output power loss.

So the optimal on-board input power belonging to a multiple carrier wave access working point is:

$$10 \log_{10}(P_S) = 10 \log(P_{ST}) - BO_i \quad \text{dBW} \quad (7)$$

where  $P_S$  is the on-board input power belonging to the optimal working point,  $P_{ST}$  is the on-board input saturation power and  $BO_i$  is the input power loss.

In the case of multiple carrier wave access satellite retranslators one of the basic tasks of design and implementation is optimal selection of the values for  $BO_i$  and  $BO_o$ . Figure 3 illustrates the optimal working point for a nonlinear satellite retranslator. The typical input/output characteristic for a helix type on-board travelling wave amplifier can be seen in Figure 2. Another study (2) deals in detail with an investigation of the capacity of satellite retranslators forwarding SCPC-FDMA carrier waves.

#### Channel Capacity in the Case of Forwarding PCM-QPSK Carrier Waves

When using the PCM-QPSK system in the "Intercsat" telephone channel generating equipment the prescribed threshold value for the signal/noise relationship is 59.3 dB and the error probability belonging to the threshold value signal/noise relationship is  $10^{-4}$ . Table 2 summarizes the carrier wave forwarding capacity in the satellite retranslators of the "Intersputnik" system in the case of the version of the "Intercsat" channel generating equipment using the PCM-QPSK method.

#### Channel Capacity in the Case of Forwarding DCADM-DBPSK Carrier Waves

Compared to the PCM-QPSK system the DCADM-DBPSK system has the following advantages from the viewpoint of carrier wave forwarding capacity:

1. In the DCADM-DBPSK system the signal forwarding speed is 32 K bits per second as opposed to the 64 K bits per second signal forwarding speed needed in the case of the PCM-QPSK system, which means a 100 percent (3 dB) capacity increase.

2. In the DCADM-DBPSK system a 56.9 dB threshold value signal/noise relationship is needed to realize a  $10^{-4}$  error probability, which makes possible an additional 3 dB capacity increase compared to the PCM-QPSK system. If we take into consideration that in the DBPSK system the signal/noise relationship which can be realized is worse by 1 dB than in the QPSK system then from the viewpoint of increasing capacity the gain of the DCADM-DBPSK system compared to the PCM-QPSK is 5 dB. In the case of a fixed on-board EIRP value the 5 dB increase (3.2 times) can be used to increase the signal forwarding capacity or, in the case of a fixed signal forwarding capacity, it can be used to reduce the on-board EIRP value. Table 2 summarizes the carrier wave forwarding capacity which can be realized with the version of the "Intersat" channel generating equipment using the DCADM-DPSK signal processing-signal forwarding method in the satellite retranslators of the "Intersputnik" system.

Table 2. Channel Capacity of a Satellite Retranslator in the Case of Forwarding PCM/QPSK and ADM/DBPSK Carrier Waves

Satellite antenna (receive/ transmit)	In Fixed Channel Operation								In Free Access Operation With Carrier Wave Suppression			
	Without carrier wave suppression				With carrier wave suppression							
	PCM/QPSK		ADM/DBPSK		PCM/QPSK		ADM/DBPSK		PCM/QPSK		ADM/DBPSK	
	G/G	G/H	G/G	G/H	G/G	G/H	G/G	G/H	G/G	G/H	G/G	G/H
(G/T)ES = 29 dB/K	66	134	210	428	168	336	524	800*	588	800*	800*	800*
(G/T)ES = 31 dB/K	108	216	344	690	270	540	800*	800*	800*	800*	800*	800*

(G/T)ES is the quality factor of the earth station.

\* means the retranslator is band limited.

$B_S = 36$  MHz: the bandwidth of the retranslator

--We have hypothesized a 4 dB activation factor for carrier wave suppression.

--In free access operation the hypothesized traffic concentration factor=3.5.

G is a global beam (17 x 17 degrees).

H is a hemispherical beam (9 x 18 degrees).

The effective power transmitted isotropically by the satellite:

--(EIRP)<sub>S</sub>=24 dBW, if the satellite antenna is G/G,

--(EIRP)<sub>S</sub>=27 dBW, if the satellite antenna is G/H.

The following conclusion can be drawn from the carrier wave forwarding capacity data of Table 2. In the fixed channel mode (the carrier waves are divided up among the ground stations connected to the satellite retranslator in a predetermined and fixed way) and using continuous carrier waves (the

carrier waves do not cut out in the pauses in the conversation) the channel capacity which the 36 MHz bandwidth of the satellite retranslator would make possible can be achieved by neither the PCM-QPSK or DCADM-DBPSK system. Thus the satellite retranslator is power limited.

### 3. Possibilities of Increasing Channel Capacity in a Power Limited Satellite Retranslator

In a power limited satellite retranslator channel capacity can be increased by the following methods: by use of speech signal activated carrier waves, with the free access operational mode and by use of error correcting coding (in systems using digital signal processing). These methods can be used separately, in any combination or all together in SCPC-FDMA systems.

#### 3.1. The Effect of Speech Signal Activated Carrier Waves

In SCPC systems we can conserve on-board transmitter power, independent of the signal processing-signal forwarding method used, if we disconnect the carrier waves in the speech pauses. The switching on and off of the carrier waves is done by a speech signal detector located in the channel units of the telephone channel generating equipment; the operation of the detector is controlled by the presence or absence of a speech signal.

On the basis of the results of studies pertaining to the statistical characteristics of speech signals it is possible to achieve an on-board transmitter power saving of 4-6 dB depending on the value of the speech activating factor. For the data in Table 2 we considered a speech activating factor of 4 dB. This means that in a satellite retranslator with an 800 carrier wave access capacity there is a need for an on-board EIRP value corresponding to only 320 carrier waves. It can be seen from Table 2 that in the fixed channel mode using speech signal activated carrier waves (carrier wave suppression) the signal forwarding capacity corresponding to 800 carrier waves cannot be achieved in the case of the PCM-QPSK system, while the satellite retranslator becomes band limited with the ADM-DPSK system.

#### 3.2 The Effect of Free Access

In free access (access according to demand) SCPC-FDMA systems the carrier waves are not divided up in advance among the ground stations. The carrier wave distribution among ground stations is a function of the momentary traffic of the satellite telephone network. If a demand (call) for one of the ground stations of the satellite telephone network arrives, then the connection is made--if a free frequency pair can be found in the frequency band of the satellite retranslator. Free access results in a traffic concentration effect. The traffic concentration factor (the quotient of the number of telephone channels needed in fixed channel and free access systems) varies between 3.5 and 4 in typical SCPC-FDMA telephone networks, and is a function of traffic intensity and of the number of ground stations connected to the satellite retranslator. For example, if the traffic intensity is 0.5 erlangs (30 channel-minutes per hour) and the number of ground stations is 40 then the value of the traffic concentration factor is 3.7. The value of the traffic concentration factor taken into consideration in determining the data in Table

2 was 3.5 (~5.5 dB). As seen from the data of Table 2, in free access operation using carrier wave suppression and with a 31 dB/K ground station quality factor, the satellite retranslator is band limited when using both the PCM-QPSK and ADM-DBPSK systems.

### 3.3 The Effect of Error Correction Coding

As can be seen from Table 2, in fixed channel operation using the PCM-QPSK system with carrier wave suppression one cannot achieve the channel capacity (800 carrier waves) which would be permitted by the bandwidth of the satellite retranslator. In this case the carrier wave forwarding capacity of the power limited satellite retranslator can be increased by using error correction coding.

Other studies (3 and 4) deal in detail with the signal forwarding capacity increase problems of power limited satellite retranslators forwarding SCPC-FDMA carrier waves, with selection of the error correction coding-decoding method optimal from the viewpoint of increasing capacity and with the application of the results obtained.

If we want to increase the carrier wave forwarding capacity of power limited satellite retranslators in digital SCPC-FDMA artificial satellite telephone networks then we can select among two sorts of methods. We can increase the time duration of the channel symbols and as a result increase the integration time of the final decision (the symbol integration time is the reciprocal value of the speed of the symbol). Or we can code the groups of source symbols and thus construct channel signals the distance of which is greater in the signal space. The first method makes necessary a reduction of symbol speed, which is not permissible in every case. In the event of using the other method, in the case where the bandwidth can be increased, the data forwarding speed remains unchanged. Error correction coding procedures serve realization of the second method. Since error correction coding is a redundant coding method it makes necessary an increase in bandwidth. It must be noted that in the case of a power limited satellite retranslator sufficient bandwidth reserve is always available. In the case of error correction coding  $E_s/N_0$  is smaller than  $E_b/N_0$  ( $E_s$  is symbol energy,  $E_b$  is bit energy and  $N_0$  is the noise power density).

As is well known, the theoretically attainable value of  $E_b/N_0$  is called the Shannon limit and is equivalent to  $\ln 2 = 0.693$  or -1.6 dB. The goal in selecting a suitable coding/decoding system is the best possible approximation of the -1.6 dB limit value. From the viewpoint of increasing the capacity of a power limited satellite retranslator one can regard as optimal that coding/decoding system which provides the greatest coding gain (coding gain is the difference in dB between the  $E_b/N_0$  value necessary to achieve the given error probability and the  $E_b/N_0$  value needed in the case of an ideal CPSK system). It must be noted that to a crucial degree the coding gain is a function of the coding/decoding system used and depends to only a small degree on the code design.

Expressing the value of  $E_b/N_0$  as a function of the power of the modulated signal received and of data speed we get the following interdependency:

$E_b/N_0 = P/N_0 R$ , where  $P$  is the power of the modulated signal received and  $R$  is the data speed. As can be seen, If we want to decrease the value of  $E_b/N_0$  in the case of the error probability prescribed with some sort of coding-modulation/demodulation-decoding system then either we must increase the value of  $R$  or decrease the value of  $P/N_0$ , or use a combination of the two methods. So the basic problem is to determine that value of  $E_b/N_0$  at which a real system can operate if the error probability is prescribed. In a power limited channel the bandwidth efficiency is poor, an increase in capacity can be achieved by decreasing  $E_b/N_0$  if the bandwidth can be increased.

Since the signal propagation time is great in artificial satellite communications systems (especially in the case of geostationary satellites), it is advantageous to use FEC methods in regard to error correction (FEC means Forward-Error-Control). The use of convolution coding should be favored in SCPC-FDMA systems because in the case of forwarding speech signals the information symbols arrive in sequence and not in blocks (in the latter case the use of block codes is more advantageous); in addition, since the channel symbol speed in SCPC systems is 32 K bits per second or 64 K bits per second there is no need to use special high speed convolution codes.

As a result we can draw the conclusion that from the viewpoint of increasing the capacity of power limited satellite retranslators in SCPC-FDMA systems the most effective solution is use of minimal forced length convolution codes and weak decision Viterbi decoding, because this provides the greatest coding gain and as a result the greatest capacity increase possibility. Since the signal forwarding speed in SCPC-FDMA systems is 32 K bits per second or 64 K bits per second Viterbi decoding can be used in the case of both continuous carrier waves and speech signal activated carrier waves. Figures 4 through 6 summarize the results obtained.

On the basis of the figures cited we can draw the following conclusions. If the prescribed value of error probability for the threshold level is  $10^{-4}$ , and the quality factor of the ground stations is smaller than 39 dB/k but greater than 32 dB/K, then the proper choice is  $r=3/4$  speed conversion convolution coding. But if the quality factor of the ground stations is less than 32 dB/K then  $r=1/2$  speed conversion codes are effective. The value of the coding gain which can be achieved (the capacity increase, or  $E_b/N_0$  reduction) is 4-6 dB.

#### 4. Summary

We have reviewed the determination of the channel capacity of power limited satellite retranslators forwarding SCPC-FDMA carrier waves and the possible methods for increasing channel capacity and we have summarized these briefly on the basis of the results of pertinent research in homogeneous satellite telephone networks.

The results obtained can be used in developing the "Intercsat" equipment and for its use in the "Intersputnik" system. The procedures developed, and their results, can be used not only in the case of PCM-QPSK and DCADM-DBPSK but also in the case of other signal processing-signal forwarding methods. In addition, they might be used even in various areas of surface radio communication.

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### Biographic Note

Gyorgy Pribelszky won an honors degree in the weak current branch of the Electrical Engineering School of the Budapest Technical University in 1956. He has worked at the Telecommunications Research Institute since 1956. Up to 1968 his research area was the system technology of microwave radio relay systems--systems design and analysis and signal processing and signal forwarding problems. Since 1968 his research area has been the systems technology of artificial satellite communications. His field of interest is primarily signal processing-signal forwarding suitable for satellite communications and problems of multiple earth station access, as well as designing systems. He publishes his results regularly in Hungarian and in foreign languages and reports on them at domestic and international conferences. He is the author of numerous articles. He has been decorated for his work a number of times.

# FIGURE CAPTIONS

1. p 116. Figure 1. Outline of the frequency plan of an SCPC-FDMA system in a homogeneous network.  
 $2N=N+N'$ : The number of carrier waves which can be forwarded by the satellite retranslator.  
 $f_m$ : Lower band limit frequency.  
 $f_M$ : Upper band limit frequency.  
 $B=f_M-f_m$ : The bandwidth of the satellite retranslator (34 MHz or 36 MHz).  
 $f_o$ : band middle frequency.  
 $f$ : Frequency distance between neighboring carrier waves (45 kHz or 80 kHz).
2. p 117. Figure 2. Typical input/output characteristic of an on-board travelling wave amplifier.  
 $BO_i$ : Input power loss.  
 $BO_o$ : Output power loss.  
 1: One carrier wave access characteristic.  
 2: Two carrier wave access characteristic.  
 3: Many carrier wave access characteristic.
3. p 117. Figure 3. Outline of optimal working point of a satellite retranslator.  
 HHE: Travelling wave amplifier.  
 $C/N_o$ : Carrier/noise power relationship.  
 $(C/N_o)_U$ : Upgoing section carrier/noise relationship.  
 $(C/N_o)_D$ : Downgoing section carrier/noise relationship.  
 $(C/N_o)_I$ : Carrier/intermodulation noise relationship (resultant of third and fifth order products).  
 $(C/N_o)_{UDI}$ : Resultant of thermic and intermodulation noise (interdependency number 5).  
 $(C/N_o)_{UDI \max}$ : Maximum of resultant carrier/noise relationship.  
 munkapont: working point  
 telitesi pont: saturation point
- 4a. p 119. Figure 4a. Changes in error probability ( $P_e$ ).
- 4b. p 119. Figure 4b. As a function of  $E_b/N_o$ .  
 The parameter Q (number of decision levels) reference system: CPSK.
5. p 120. Figure 5. Changes in error probability ( $P_e$ ) as a function of  $E_b/N_o$  in a Gauss channel.  
 Reference system: An "ideal" CPSK.  
 Viterbi decoding,  $K=7$ ,  $r=1/2$ ,  $P_e=10^{-5}$ .  
 1. "Strong" (eros) decision:  $E_b/N_o=6.5$  dB,  $G_C=3.1$  dB.  
 2. "Weak" (gyenge) decision:  $E_b/N_o=4.5$  dB,  $G_C=5.1$  dB.

6. p 120. Figure 6. Satellite retranslator channel capacity with coding and without coding as a function of the earth station quality factor. With carrier suppression and with free access.

$B_s = 36$  MHz.

1. If  $(G/T)_{ES}$  equal to or less than 39 dB/K then  $r = 3/4$ .
2. If  $(G/T)_{ES}$  equal to or less than 31 dB, then  $r = 1/2$ .

kodolas nelkul: without coding.

8984

CSO: 5500/3015

TELECOMMUNICATIONS REGULATORY LEGISLATION

Equipment, Line Registration Procedures

Warsaw MONITOR POLSKI in Polish No 18, 1 Jul 86 item 123 pp 229-230

[Minister of Communications Directive of June 26, 1986 on Registering Telecommunication Lines and Equipment]

[Text] Based on article 28, paragraph 3 of the Law of 15 November 1984 on Communications (DZIENNIK USTAW, No 54, item 275) the following is directed:

Article 1. 1. This directive establishes regulations for registering equipment and lines for:

- 1) intraministerial telecommunication networks;
  - 2) intraplant telecommunication networks operating in conjunction with public-use telecommunication networks;
  - 3) telecommunication networks established and operated on the basis of individual permission of the minister of communications.
2. Regulations for registering telecommunication lines and equipment for the public-use network are established by the separate regulations on passportization and registration.

Article 2. Operators of the telecommunication lines designated in article 1, paragraph 1 must provide registration data regarding:

- 1) intraministerial line telecommunication networks and line networks established and operated on the basis of individual permission from the minister of communications, to the authorized local directorate of the postal and telecommunications district;
- 2) intraplant line telecommunication networks, to the authorized local voivodship telecommunications office and, for Katowice and Warsaw, to the regional telecommunications office;

3) radio telecommunication lines and radiocommunication networks established and operated on the basis of individual permission from the minister of communications, to the authorized local district inspectorate of the State Radio Inspectorate.

Article 3. The registration of intraministerial telecommunication networks and telecommunication networks established and operated on the basis of individual permission from the minister of communications should include the following information:

1) for cable and overhead lines:

a) routing of local telecommunication lines on a contour map of the given area or on the city plan;

b) routing of intercity telecommunication lines on a 1:500000 scale contour map of Poland;

c) lengths of the individual line segments;

d) number of ministerial lines;

e) intended use of lines;

f) cable type and profile;

g) number of pairs of cable or overhead lines, and the frequency range for multiple telephony, or the number of optical fiber cables;

h) parameters of the optical fiber cable;

i) line utilization;

j) number of intermedial and terminal repeater stations, of fiber optic receiving and transmitting devices, designating their source of power (remote, local) and their location (underground or overhead) and type of teletransmission equipment.

2) for radio telecommunications links:

a) routing of radio links on a 1:500000 scale contour map of Poland;

b) lengths of line segments;

c) number of ministerial lines;

d) equipment types and name of producers;

e) operating frequencies;

f) number of telephone channels and their utilization;

- g) transmitter output powers;
  - h) heights of antennas above earth's surface;
  - i) antenna types and parameters (power gain, angle of radiation).
- 3) for radiocommunication networks:
- a) location of base stations (geographic coordinates), name of users and call letters;
  - b) operating frequencies of the base stations;
  - c) equipment types and name of producers;
  - d) output power of transmitters and station ranges;
  - e) heights of antennas above earth's surface;
  - f) antenna types (maximum radiation azimuth for directional antennas).

Article 4. The registration for intraplant telecommunication networks operating in conjunction with the public-use telecommunication network should include:

- 1) data concerning private branch exchanges (PBX), especially:
- a) types of equipment and producer names;
  - b) production year and date connected to the public-use telecommunication network;
  - c) location of installation.
- 2) technical and operating data for the individual exchanges, specifying their:
- a) type of operation with the public-use network (automatic, semi-automatic, manual);
  - b) capacity in numbers;
  - c) utilization in numbers;
  - d) technical data for the power supply equipment;
  - e) number of internal telephone numbers authorized to use the public-use telecommunication network;
  - f) number and types of internal telephones (for example, MB, CB, CBa) connected to the PBXs;

g) number and types of telephone lines operating in conjunction with other exchanges.

Article 5. If justified, users of telecommunication equipment and lines must present additional registration data when demanded by the organizational units designated in article 2.

Article 6. 1. Registration documentation for telecommunication equipment and lines should include:

- 1) current status of data;
- 2) symbols use in telecommunications;
- 3) appropriate indicators of secret or confidential classification.

2. Users of telecommunication lines and equipment must provide to the organizational units designated in article 2:

1) the registration data within 14 days after the telecommunication equipment and lines are placed in operation;

2) any changes in the registration data for the telecommunication equipment and lines that occurred in the previous calendar year; these changes must be reported by January 31 of the following year;

3) the initial registration data for 1985, reflecting the status as of December 31, 1985, should be submitted by November 30, 1986.

Article 7. 1. The voivodship telecommunications offices and, for Katowice and Warsaw, the regional telecommunications offices send the registration data described in article 4 to the authorized postal and telecommunications district directorate by February 10 of the following year.

2. The postal and telecommunications district directorates make up a list of the registration data for a given calendar year for all the telecommunication lines and equipment described in article 3, point 1, and in article 4 and transmit it to the Telecommunications Services Administration by February 20 of the following year.

3. The district inspectorates of the State Radio Inspectorate send the data designated in article 3, points 2 and 3, to the Main Inspectorate of the State Radio Inspectorate by February 20 of the following year.

Article 8. This directive is effective the day it is announced.

Minister of Communications: W. Majewski

#### High Frequency Emitting Devices

Warsaw DZIENNIK USTAW in Polish No 25, 1 Jul 86 item 121 p 370

/Ministry of Communications Decree of June 7, 1986 on Machinery and Equipment Generating High Frequency Electromagnetic Fields Subject to the Mandatory Notice of the State Radio Inspectorate/

[Text] Based on article 32, paragraph 4 of the November 15, 1984 Law on Communications (DZIENNIK USTAW, No 54, item 275), the following is decreed:

Article 1. All machinery and equipment generating high frequency electromagnetic fields in the 9 kHz (kilohertz) to 400 GHz (gigahertz) range are subject to the mandatory notice of the State Radio Inspectorate regardless of their designation, especially:

- 1) induction heating equipment;
- 2) high frequency welders and driers;
- 3) surgical and therapeutic diathermia;

4) other equipment containing high frequency generators whose output powers are 100 W (watts) or more.

Article 2. The machinery and equipment listed in article 1 must meet the following technical requirements regarding prevention of interference in the operation of telecommunication equipment:

1) The frequency of the generated electromagnetic field must correspond only to one of the following frequencies: 8 kHz, 10 kHz, 22 kHz, 44 kHz, 66 kHz, 135.6 kHz, 440 kHz, 1.76 MHz, 3.39 MHz, 6.78 MHz, 13.56 MHz, 27.12 MHz, 40.68 MHz, 81.36 MHz, 152.5 MHz, 433.92 MHz, 2.45 GHz and 5.8 GHz;

2) The frequencies designated in point 1 may vary 0.05 to 10 percent depending on the type of machinery and equipment, their designation or location.

Article 3. The frequency of the electromagnetic field may not be higher than those designated in article 2 if the output power of the machine or equipment changes.

Article 4. If the machine or equipment does not meet the requirements designated in article 2, a radio interference filter or a radio interference shield must be included as part of its installation.

Article 5. This decree is effective on the date of its announcement.

Minister of Communications: W. Majewski

#### Line Network Use Rules

Warsaw DZIENNIK USTAW in Polish No 25, 1 Jul 86 item 122 pp 370-371

[Minister of Communications Decree of June 16, 1986 on Installing and Using Line Telecommunication Networks]

/Text/ Based on article 19, paragraph 1, points 1 and 2 of the November 15, 1984 law on communications (DZIENNIK USTAW, No 54, item 275), the following is decreed:

Article 1. 1. An internal line telecommunication network, henceforth called "intraplant network," that is designed to execute functional and technological tasks, can be installed and used within the limits of a single workplace, farm unit, forestry unit, building or vehicle.

2. In justified cases and after obtaining the approval of the locally authorized voivodship telecommunications office, intraplant telecommunication networks can be created for the joint use of several workplaces located in the same building or group of buildings.

3. A single workplace is defined as:

1) quarters located on the area of a single property in one or several buildings that are functionally interlinked, that are occupied by a legal, physical person or an unincorporated organizational unit;

2) a group of buildings managed by a legal, physical person or an unincorporated organizational unit, that is located on the territory of one or several adjoining properties or, for mining structures, on the territory of a single mining conferment;

3) neighboring technological structures used to generate, transmit and distribute electrical energy or fuel gases;

4) Polish State Railroads (a state enterprise) structures, buildings and their adjoining railroad lands on Polish territory that are managed by this enterprise, except residential and social buildings not located on railroad land.

4. A single farm unit is considered to be the buildings and their adjoining farmland or livestock breeding areas that are managed by a legal, physical person or an unincorporated organizational unit, that is located on the territory of a single or adjoining gminas within the confines of a single local network.

5. A single forestry unit is considered to be:

1) buildings and structures associated with forest management together with adjoining forest lands that are managed by a legal, physical person or an unincorporated organizational unit, that is located on the territory of a single forest inspectorate;

2) a separate national park.

6. A single building is considered to be:

1) a closed structure having walls and a roof that is managed by a legal, physical person or an unincorporated organizational unit;

2) a group of interlinked buildings that is managed by a legal, physical person or an unincorporated organizational unit.

Article 2. Permission must be obtained from the Telecommunications Services Administration to install and operate a line telecommunication network that exceeds the scope of an intraplant network.

Article 3. The permit application should specifically include:

- 1) network type and size;
- 2) network location;
- 3) projected network installation schedule;
- 4) an indication that the permit is to be issued for a definite or indefinite time period.

Article 4. 1. A permit is issued for a definite or indefinite time period.

2. The permit designates the specific conditions for installing and using a network, specifically:

- 1) the network size;
- 2) how the network can be disabled technically;
- 3) method of interlinking the network with the public-use telecommunication network.

Article 5. The permit may be revoked by the Telecommunications Services Administration if:

- 1) the conditions specified on the permit are violated;
- 2) the network is operated contrary to the law, public order or the principle of social coexistence, and the revocation is justified and recommended by the authorized local state administration organ.

Article 6. The following local authorities verify that the conditions specified on the permit are being observed:

- 1) voivodship telecommunications offices;
- 2) for Katowice and Warsaw, the regional telecommunications offices.

Article 7. The Telecommunications Services Administration decides if a line telecommunication network is disconnected from the public-use telecommunication network if:

- 1) the network is installed or used without permission;

2) the permit has expired;

3) the conditions psecified on the permit are not observed.

Article 8. A Telecommunications Services Administration decision may be appealed to the minister of communications within 14 days after the decision is rendered.

Article 9. Fees for issuing permits are designated in separate regulations.

Article 10. Decisions (approvals) of the minister of communications on installing and using line telecommunication networks that do not meet the conditions for intraplant networks but that were issued on the basis of existing regulations are considered to be valid within the meaning of this decree.

Minister of Communications: W. Majewski

11899

CSO:5500/3017

ARGENTINA

CLANDESTINE BROADCASTING STATIONS REPORTEDLY INCREASING

Buenos Aires TIEMPO ARGENTINO in Spanish 16 Aug 86 p 18

[Article by Andrea Rodriguez]

[Text] Some weeks ago, ARPA [Private Radio Stations Association of Argentina] issued a statement denouncing the "constant appearance of clandestine broadcasting stations, either private or supported by provinces and cities," and urged the state to "make use of the institutional mechanisms it has available to restore the state of law which has been destroyed by these uncontrolled activities." The private broadcasters' statement was issued in response to the establishment in recent years of numerous radio stations which--by appropriating a frequency--make broadcasts without legal authorization.

In order to determine what is legal and what is illegal in broadcasting, we must go back to Law 22,285, issued in September 1980 by the then de facto president, Jorge Rafael Videla, and still in effect now, even though it is considered antidemocratic by the entire Argentine political spectrum. This law recognizes COMFER [Federal Broadcasting Committee] as the only organization empowered to grant radio and television operating licenses. However, a few months after taking office, the present government suspended the invitations for bids scheduled by the military government's National Broadcasting Plan, until a new law was passed. According to Pedro Sanchez, COMFER's current licensing regulations representative, "when there is a stalemate in the legal ability to conduct bidding to set up new stations, a sort of repressed energy is created, which is now escaping through these clandestine operations."

COMFER is aware of the existence of approximately 50 "pirate" radio stations. The head of COMFER stated that "all of them have been reported to the department of communications, with details on their location, method of operation, and technical capacity. The department of communications will have to proceed with the seizure and confiscation of these unauthorized stations and equipment."

According to ARPA's secretary, Rafael Penaloza, the proliferation of "pirate" radio stations indicates the existence of "a spirit of anarchy subversive of

the nation's legal values," which will lead to the rise of a "parallel broadcasting system." What concerns the broadcasters is that "the clandestine broadcasters are competing against the legal stations, conspiring to take away their business," and also the fact that "there is no sort of control over the messages they are broadcasting."

The "pirate" stations generally transmit on FM, using simple, low-cost and easily transportable equipment, about the size of a shoebox with a power of 1 watt, giving it a range of about 10 kilometers around the transmitter. In Argentina, the majority of the clandestine broadcasters are located in the interior, and the reasons motivating them all differ, sometimes quite drastically. While some were born in response to a local community need, others started with the sole purpose of challenging the system and changing the present communications codes.

In Neuquen over six illegal stations are operating with the backing of the provincial government. They play an important social role. The legislature of this province--trying to give its communities the right to use radio frequencies for their own benefit--in January of this year passed a broadcasting law which placed the control of radio and television broadcasting operations within the province under its jurisdiction. One of the reasons behind this law was the fact that Neuquen has only four AM radio stations.

A few days later, COMFER filed an appeal for an injunction with the Supreme Court, requesting that the provincial law be ruled unconstitutional. COMFER argued that this law was "a subjection of the nation to the province." The court ruled in favor of this argument and ordered the Neuquen government to set aside the law.

Another consideration motivating the Neuquen legislature in approving the law was "the risk of losing, in 1987, some of the frequencies obtained under the Rio de Janeiro Agreement, because these frequencies are not being used." Argentina is already in an unfavorable position in relation to other countries, as in 1946 it withdrew from the regional agreement, thus losing the possibility of acquiring new frequency allocations. Moreover, the Argentine stations have a maximum power of 25 kilowatts. This power can not compete with the powerful 200-kilowatt transmitters used by nations like Brazil and Chile.

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CSO: 5500/279

## ARGENTINA

### BRIEFS

NEW COMMUNICATIONS NETWORK--La Rioja. Today at 1200 a contract will be signed between the provincial government and the firm Equitel, S.A. This plan covers the construction of six buildings, 13 external facilities, and the supply, installation and preparation for operation of 15 telephone exchanges in the city of La Rioja and in the towns of Chilecito, Amogasta, Chepes, Vinchina, Vichigasta, Guandacol, Aminga, El Milagro, Famatina, Salicas, V. Castelli, Olta, Ulapes, and Patquia. These projects have their origin in the financial assistance agreement signed on 15 February 1985 between the provincial government of La Rioja and ENTEL [National Telecommunications Company], with ENTEL taking charge--among other things--of the necessary long-distance infrastructure projects, the expansion of automatic long-distance centers, the supply and installation of long-distance public telephones in the locations of Tama, Malazan, Los Palacios, Talampaya, Pagancillo, Santa Clara, Banda Florida, Alto Jague, Potrero Grande, Pituli, Santa Cruz, Pinchas, Chuquis, Los Molinos, Anjullon, San Pedro, and Santa Cruz (in Castro Barros department). The projects undertaken by the province will be supported by direct payments from future users, who to date have signed more usage agreements than the total number of lines being contracted. For this reason, the agreement with ENTEL is to be expanded, and a contract for the additional projects will be drawn up as soon as possible. The time period for completion of the projects is 36 months from the signing of the contract, and telephone exchanges will be placed in service starting in 12 months, according to the contract schedule. Under this agreement, 30 new locations in La Rioja province will have access to the national telephone system, and will enjoy the same facilities as customers in the largest urban areas of Argentina. In addition, La Rioja will become one of the provinces with the best communications in the nation. [Text] [Buenos Aires CLARIN in Spanish 20 Aug 86 p 47] 7679

DELTA REGION COMMUNICATIONS--La Plata. The undersecretary of government for Buenos Aires, Dr Luis Miralles, has announced that within 90 days schools in the Delta region will be connected by modern communications equipment, and will then be able to join the provincial network. The official, who is serving as provincial representative to CONINDELTA [Intercommunal Council of the Delta], said that bids will be conducted to purchase 25 units of VHF equipment, along with the necessary antennas and accessory equipment, to provide this service to 25 academic establishments. Dr Miralles added that the CONINDELTA is still actively working on an electrification program and a signallization project for the Buenos Aires delta region. He reported that some private companies have already submitted bids for these projects. [Text] [Buenos Aires CLARIN in Spanish 20 Aug 86 p 47] 7679

## BRIEFS

NEW EMBRATEL SERVICE--Embratel, Brazilian Telecommunications Company, will participate in the Informatics Fair by presenting the Renpac [Rede de Comunicacao de Dados por Conmutacao de Pactoes] Service, a communication network for Data Package Relay Network. This new public service for use inside Brazil will be connected with the international data and communications service, Interdata. [Excerpt] [[Rio de Janeiro O GLOBO in Portuguese 13 Aug 86 p 29 PY] /12232

TELEPHONE, TELEX FEES REDUCED--Telephone and Telex rates between Brazil and Portugal have been reduced by 30 percent by an agreement signed in July between Embratel [Brazilian Telecommunications Company] and the Portuguese Radio Marconi Company. As of now, a 1-minute telephone communication with Portugal costs 32 cruzados during business hours, and 25.70 cruzados at night and on weekends. A 1-minute telex communication will be 33.60 cruzados. [Text] [Brasilia Radio Nacional da Amazonia Network in Portuguese 1000 GMT 3 Sep 86 PY] /12232

TELEPHONE EXPANSION PLAN--Communications Minister Antonio Carlos Magalhaes, in the company of Minister Marcos Maciel and other political leaders, today will launch a telephone expansion plan in Recife for 55,000 new terminals and a master plan for a rural telephone system that will benefit 524 towns and villages in Pernambuco State. During the same ceremony to be held at 1100 at the Convention Center, Magalhaes will also dedicate 36 telephone and telegraph offices, 178 public phones, the expansion of interurban channels among 52 towns, Domestic Direct Dial and International Direct Dial services in 16 towns, a humanitarian telephone system in the community of Doelho, and an educational video program service. The minister will also sign contracts with supply companies for the installation of 26,152 phone terminals. Another contract for the opening of 72 telephone and telegraph offices will be signed with the Pernambuco State Government, with the City Council, and with the Pernambuco State Telecommunications Enterprise. [Text] [Brasilia Radio Nacional da Amazonia Network in Portuguese 1000 GMT 29 Sep 86 PY] /12232

CSO: 5500/2002

## TV BROADCASTS OVERSEAS VIA SOVIET SATELLITE UNDERWAY

Havana GRANMA in Spanish 24 Jul 86 p 3

[Article by Gustavo Robreno]

[Text] The images of the main ceremony marking the 33rd anniversary of the assault on the Moncada Barracks, to be broadcast from Sancti Spiritus, will be the first international television transmission that the Cuban Institute of Radio and Television (ICRT) will send across the airwaves. The broadcasts will be aimed at Cuban internationalists who are performing their aid and cooperation duties, the diplomatic missions, and Cuba's friends in different regions of the world.

The launching of this service was announced in the Central Report to the 3rd Party Congress by Commander in Chief Fidel Castro. In a few months, this will become a reality that will enable a variety of programs containing informative features, entertainment, culture, sports, and music to be transmitted via satellite.

A beautiful melody composed and sung by Pablito Milanes just for this occasion will be the theme song of the broadcasts. During the initial phase, the programs will go on the air for 3 hours on Fridays, Saturdays, and Sundays from 1800 to 2100 hours (Cuba time). This schedule may be extended in the future if the need arises.

Geostationary Satellite 4 of the Intersputnik system, located at 14 degrees west over the Atlantic Ocean, will be the medium used to broadcast these transmissions. This will enable them to be picked up on Channel 11 in various parts of the world with the installation of the corresponding antenna and receiver. Eastern North America, the Caribbean, South America, Africa, and Europe will fall within its range.

An additional advantage is that this signal can be received by other satellite ground stations that the Communications Ministry is building in the country. Thus, there will be an alternative way to broadcast the usual television transmissions in case the national microwave network is disrupted.

It was learned that the programming will be drawn primarily from materials selected from those currently being broadcast by the two channels of Cuban

Television, although it will also be taken from other institutions in our country devoted to developing film and television materials.

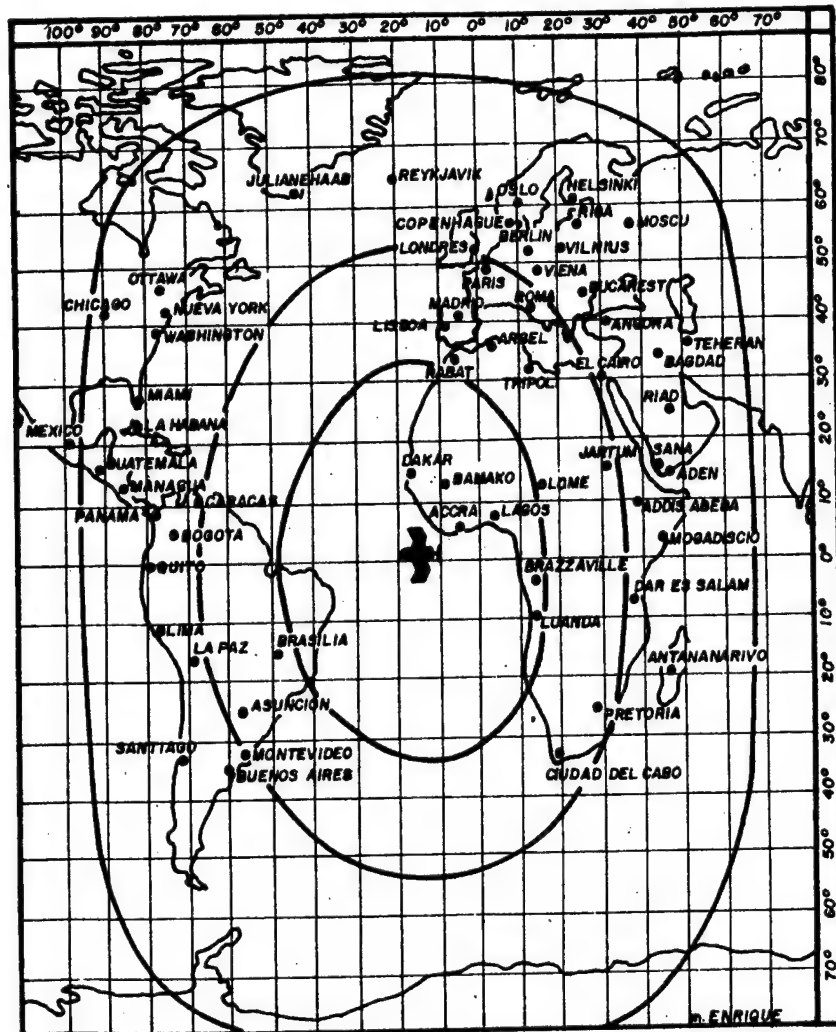


Illustration of the range of transmissions from Geostationary Satellite 4, located above the Atlantic Ocean.

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CSO: 5500/2081

## BRIEFS

TRANS-CARIBBEAN CABLE--A draft agreement is being formulated for the establishment of a trans-Caribbean submarine cable system linking Jamaica with the United States, Haiti, the Dominican Republic and Colombia. Mr Trevor Minott, General Manager of Jamaica International Telecommunications Limited (JAMINTEL), told JAMPRESS on Tuesday that although the agreement was in its final planning stage it was not expected that signing would take place before next year. Announcement of the establishment of the cable was made last year, April, by Minister of Public Utilities and Transport, the Hon Pearnel Charles. Mr Charles said the project, estimated to cost U.S.\$-144 million, was part of JAMINTEL's Capital Development Programme. He said the fact that Jamaica was chosen to be the centre of this system was a tribute "to the competence of Jamaicans who will operate and maintain the equipment and a recognition by the western Caribbean and the United States of the stability of our country." [Text] [Kingston THE DAILY GLEANER in English 5 Sep 86 p 29] /9317

BROADCASTING BOARD APPOINTMENTS--Three new members were appointed to the Board of the Jamaica Broadcasting Corporation yesterday by Prime Minister Edward Seaga. They are: Mr Carey Robinson, Executive Director of the National Heritage Trust and a former General Manager of the JBC; Mr Oswald Woodham of O.P. Woodham and Associates (Consulting Engineers); and Miss Pat Sinclair, Director of the Women's Bureau, Ministry of Youth and Community Development. The three members replace General Manager, the late Mrs Gloria Lannaman, Mr Gordon Wells and Mr Ulric Simmonds. Mr Wells resigned to take up position as member of the Broadcasting Commission while Mr Simmonds is consulting editor at the JBC. Meanwhile, acting General Manager Mr Garth Rose will be leaving the island for three weeks to do company business in the United States. He is expected to return mid-September. [Text] [Kingston THE DAILY GLEANER in English 29 Aug 86 p 3] /9317

CSO: 5540/004

REGIONAL AFFAIRS

BRIEFS

JORDAN, SYRIA MICROWAVE TALKS--Amman (PETRA)--Jordan and Syria on Sunday started talks at the Telecommunications Corporation (TCC) on a planned microwave telecommunications project to link Jordan, Syria and Saudi Arabia. TCC Assistant Director General 'Akif Harb, who is heading the Jordanian side in the 3-day talks, said that the project would make available vital channel of communications between the three countries and would meet the telephone and telex needs of the three countries until the year 2000 and beyond. The project, he said, was expected to be completed and put into actual service within 3 years. He said that participants in the Amman talks would discuss and evaluate 16 bids submitted by world companies. The Syrian side in the talks include five senior officials from the Syrian General Telecommunication Corporation.  
[Text] [Amman JORDAN TIMES in English 15 Sep 86 p 1] /9604

CSO: 5500/4501

## AFGHANISTAN

### BRIEFS

NEW RADIO STATION--The local radio of Maymana--the capital of Faryab Province--was recently opened at a ceremony and commenced broadcasting. A spokesman of the communication department of Faryab Province told a BIA correspondent in Maymana that the local radio presently broadcasts 4 hours daily on shortwave and reaches an area of 60-70 km. The source added that the broadcasts of Maymana's local radio, in addition to broadcasting local news and commentaries, will also carry Radio Afghanistan programs. According to another source, local radios are active in 14 DRA provinces presently and each station averages 4 hours of daily broadcasts in local languages. [Text] [Kabul Domestic Service in Dari 1600 GMT 23 Sep 86 LD] /9599

CSO: 5500/4700

## TELECOM SERVICES MAY SUFFER FROM BUDGET SHORTAGE

New Delhi PATRIOT in English 29 Aug 86 p 5

[Text]

The Department of Telecommunications is impressing upon the Planning Commission and the Finance Ministry to allow it to raise Rs 2,000 crore through public borrowings and financial institutions to finance the seventh Plan commitments.

The Planning Commission has allotted a little over Rs 4,000 crore for the department for the plan period against its projected demand of around Rs 12,000 crore.

Thus, the allocation made by the Planning Commission has put the department in a jeopardy. The department is in such a fix that it fears that with such a meagre allotment it would barely be possible for it to absorb the full production of its first ever electronic switching system unit at Mankapur in UP.

The department feels that the Rs 2,000 crore that it wants to raise through various sources would give it a breather as even this additional amount would fall very short of its needs.

Even as the department, for instance, is finding it difficult to absorb the full production of the Mankapur unit, the Union Cabinet had as early as 1983 decided a second electronic switching system plant in the wake of the country's burgeoning telecom demands.

The Cabinet, it is said, had approved the second plant proposal with a view that the department

would get something like Rs 10,000 to Rs 13,000 crore for the seventh Plan for the expansion of the telecom services in the country.

But now the country is finding itself in the worst resource crunch. Though, the Planning Commission has done overall pruning in the seventh Plan demands of the various Central Ministries, the Communication Ministry feels that the Department of Telecommunications has been hit the worst.

The result, according to the ministerial sources, would be further lengthening of waiting queues for telephone. For example, at the end of 1976-77 the number of people waiting for telephone connections were around 200,000 and now their number has increased at least five-fold.

The department fears that even if the Planning Commission and the Finance Ministry give the green signal for raising of additional Rs 2,000 crore it would not be able to meet much of the pressing demands.

The first casualty would be lesser telephone lines would be made available than it would have liked to. It is apprehensive of not being able to install more than 300,000 to 400,000 telephone lines by the end of seventh Plan which is in its second year now.

Of course, it would also hit other means of telecom like telex, teleprinter and others.

/13046

CSO: 5550/0003

TELECOMMUNICATIONS CORPORATION TO BE COMPLETELY PRIVATIZED

Amman JORDAN TIMES in English 30 Aug 86 p 3

[Article by Rana Sabbagh]

[Text] Communications Minister Muhieddine Al Hussein Friday said he expected the complete privatisation of the Telecommunications Corporations (TTC) to be completed between the end of 1987 and the beginning of 1988.

"At the rate things are developing, I can say that TCC's conversion from a government-owned institution to a commercial entity will need one or one and a half year from now," Mr. Hussein, who also is chairman of the TCC board of directors, told the Jordan Times.

The TCC, a government-owned corporation has had a monopoly over all telecommunications services in the Kingdom since it was established under a law in 1971.

The minister said that the first stage towards changing the corporation's status will be through converting it into a public shareholding company with all the shares to be owned by the government.

Mr. Hussein said he did not expect the government to relinquish 100 per cent of the shares. "Since the government will own all TCC shares prior to its total privatisation, it will decide on the total percentage of shares it wishes to maintain or sell," said Mr. Hussein, a staunch supporter of privatising the corporation.

However, the final picture of dividing the shares between the public and private institutions remains up to the government; the

minister continued. "This cabinet is willing to privatise TCC and to sell shares to the private sector, but another government might decide to keep all the shares to itself," he added.

Last March, TCC's board of directors endorsed a decision recommending the conversion of the TCC into a public shareholding company to pave the way for its complete privatisation.

British Teleconsult, which carried out the feasibility study free of charge, stands good chances of being named the consultant to restructure the TCC into a commercial institution before the corporation is completely privatised.

The idea of privatising TCC was called for by Prime Minister Zaid Rifai, who requested the ministry to conduct research on the viability of privatisation.

On Wednesday, the cabinet decided to transform a number of public organisations into share-holding companies operating on a commercial basis to open the way for the private sector to own part of the capital. The cabinet's statement said transformations should be done "in a stage-by-stage process" after intensive studies and that the

programme of priorities should be worked out while the means of implementation should be studied.

The cabinet communique did not mention names of any projected public companies at stake, but Mr. Hussein affirmed that the TCC was one of the institutions. The issue of converting the TCC into a commercial entity first arose at the end of 1984 and drew mixed reactions from public and private sector officials.

Mr. Hussein, together with other supporters of privatisation, has maintained that increased profitability, more efficiency and an improvement in telecommunications services are the main motives for privatising the corporation. Opposers of the idea contend that before such a step is taken, organisers should study the extent to which the private sector can take part in holding shares.

"The TCC is a huge empire with lots of investments including paid up capital, assets, liabilities and turnover, so if the private sector can raise enough funds to take a large share in the corporation then its conversion could be justified," commented a senior economist, who preferred anonymity. There is no official figure on the total of

the TCC's investments, but sources close to the corporation put the figure at over JD 260 million.

#### Fast mail to Iraq

In another related development, the Ministry of Communications Thursday announced that it intends to add Iraq to a list of countries with which it maintains a 24-hour fast mail delivery service.

Under secretary at the ministry, Mansour Ibn Tarif, said that the central post office in downtown Amman will include Iraq in the express mail system as of next Monday. Alia, the Royal Jordanian Airline, is in charge of carrying both the incoming and outgoing mail.

The ministry launched the system on July 1 and is currently operating the service with the following countries; Kuwait, the United Arab Emirates, Qatar, Oman, Egypt, West Germany, the United Kingdom, France and Bahrain.

Mr. Ibn Tarif told the Jordan News Agency, Petra, that the ministry is currently negotiating with five other foreign countries for inclusion in the service. He did not name the countries.

/13104

CSO: 5500/4510

## NEW TELECOMMUNICATIONS CABLE LAID TO LINK WITH PAKISTAN

Dubayy KHALEEJ TIMES in English 3 Sep 86 p 3

[Article by M.A. Qudoos]

[Text] THE purpose-built vessel 'Cable Venture' begins laying the 1200-km long submarine cable between the UAE and Pakistan this morning from Fujairah.

The ship, which sailed into the Fujairah Port yesterday morning anchored outside the port in the night to study the water currents. Today it will stay two km away from the landing point near Fujairah Hilton to start the laying operation.

The coaxial cable will be brought from the ship to the beach by a boat and tied to a bulldozer which will pull the cable to the point where it will be jointed with the land cable. The three km land cable from the terminal station at Fujairah to the jointing point at the beach has already been laid and equipment installed at the station.

The operation will be over by noon and the ship will then sail back to Karachi laying 1030km of cable through the linear cable machine at one stretch at a speed of four knots per hour on a 24-hour basis.

The 120-strong crew and engineers on board were yesterday busy preparing for today's assignment—making loops, filling the balloons with air. The balloons are tied to the cable to keep it afloat till it is jointed with the land cable. They are then cut off so that the cable sinks to the sea bed.

In Karachi, the ship will pick up the Pakistan end of the cable eight km off shore and come back for splicing at a point at 113km in the Indian Ocean along the Mekran Coast. The ship will then come to

Fujairah to discharge the surplus cable.

On the Pakistan side, 25km of land cable from the terminal station in Karachi to the landing point at Hawks Bay and the eight km inshore cable have already been laid. The onshore job was done by a Pakistani vessel, M.V. Al Amin.

Brig. Mansoor-ul-Haq, Director-General of Pakistan Telegraph and Telephones Department, told Khaleej Times on board Cable Venture that 408 channels of the 1200 high quality channel system will be commissioned on December 20 this year. The system provides an alternate to the satellite communication between the two countries.

"There has been a great deal of congestion on the existing channels. After December, the availability of the channels to the subscribers will be 100 per cent and instantaneous," he said.

### Maintenance work

The remaining channels will be gradually used by Pakistan for communications with other Arab and Gulf countries and countries in the Atlantic satellite covered areas, he said.

Brig. Malik said the \$50 million project, approved in 1983, was being implemented without encountering any difficulty, and was being completed ahead of schedule. The cost is being equally shared by the Emirates Telecommunication Corporation and the Pakistan T&T Department.

Brig. Malik will discuss subsequent maintenance of the cable with Ali Salim Al Owais, General Manager of Etisalat, during his stay in the UAE.

Ali Al Azom, East Coast Manager of Etisalat, said the project would provide improved telephone and other communication facilities to the people of Pakistan and the UAE.

M.N.A. Kirmani, director of the project, who has come with assistant engineer Mahmood Shaikh on the vessel, said that the maximum depth on the route of the cable was 3.5km where the temperature was 2°C. He said 3.1km of the cable at the Karachi coast and two km at Fujairah beach will be buried two feet deep in the sea bed by a special submersible dredger, because the waters are shallow.

He said there are 98 repeaters on the route. Their spacing is 13km for 1.5 inch diameter cable and eight km for one inch cable. The repeaters make good the alternation loss in the cable. The 98 repeaters include three equalisers for equalisation of the system due to change in temperature and other effects.

Mr Kirmani said that the life of the cable and repeaters was 25 years and it was expected that no fault will occur during their lifetime due to the design. Heavily armoured cable has been used at the shore ends to counter hazards from fishing, trawling and anchoring, in addition to burying a portion of the cable at the shore ends.

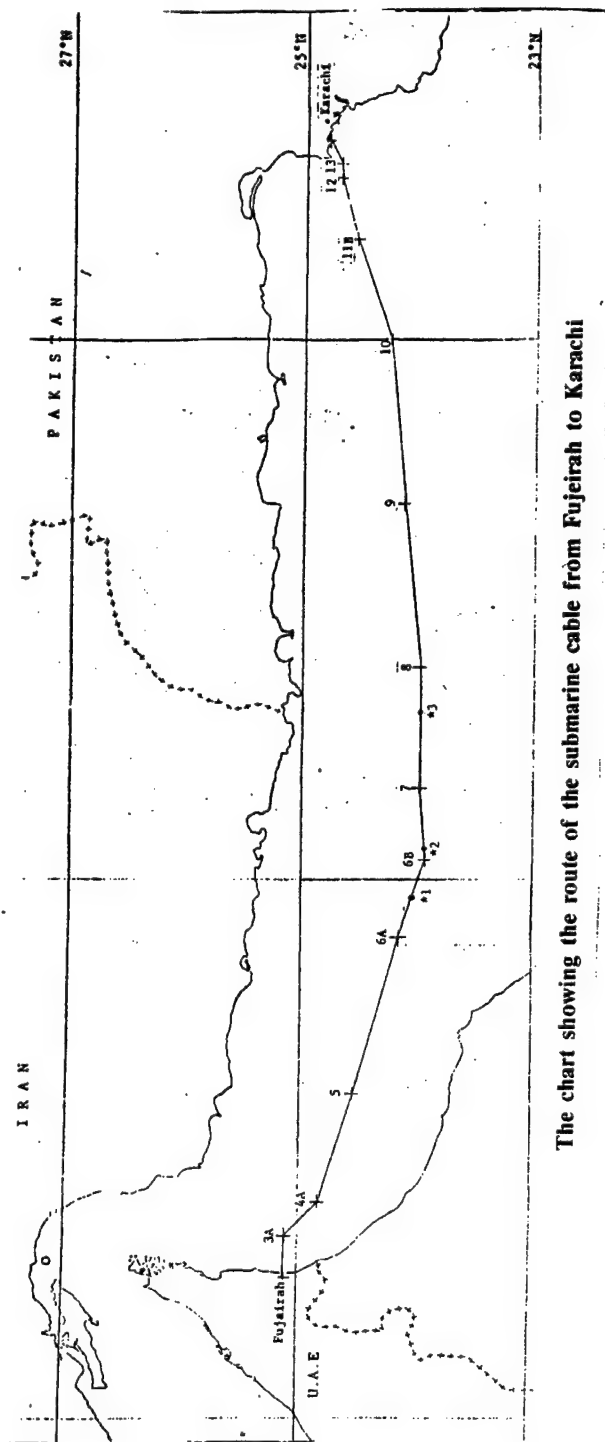
He said the submarine cable system had many advantages. Firstly, there was just 15 milliseconds delay in the transmission of messages compared to 250 to 500 millisecond delay in satellite communication which

was magnified in multi-hop transmission. Such delay was not tolerated in the transmission of high speed data. Secondly, there was echo in the satellite communication if the echo suppressor was not properly adjusted; submarine cable had no such problems. Thirdly, a mix of satellite and submarine communication is preferred in the advanced administration of the telecommunications.

Stig Lindohf, senior consultant of Swedish Telecoms International, which is the consultant of the project, said that since the sea bed was not plain, some extra cable lengths will be dropped so that the cable did not hang in the sea but adjusted to the soft, slopy and rocky areas. The firm is also supervising the project. The company was the consultant for the Gulf submarine cable linking UAE, Qatar and Bahrain. It is also the consultant for the UAE-India submarine cable project.

Issobe S., general manager overseas construction of Fujitsu Ltd of Japan, said his company was the main contractor for the UAE-Pakistan project. He said the equipment for the project was manufactured by Ocean Cable Company, NEC and Fujitsu. His company was also managing the implementation of the whole project. Cable Venture was chartered by Fujitsu for laying the cable.

Captain I.R. Bosworth of Cable Venture said the vessel, owned by Cable and Wireless (Marine) Ltd, was one of the largest cable laying vessels. It had four large cable tanks in which 1200km of cable for the project was loaded from Yokohama. His company had a fleet of five cable-laying and repairing ships.



The chart showing the route of the submarine cable from Fujairah to Karachi

/13104  
CSO: 5500/4511

TRANSMITTER OPERATING TO MASK RSA BROADCASTS

MB232141 Johannesburg SAPA in English 2138 GMT 23 Sep 86

[Text] Harare Sept 23 SAPA — A radio and television transmitter has been installed at the southern border town of Beitbridge under a government resolve to shield all bordering and remote areas from the South African Broadcasting Corporation (SABC), the Senate heard here today, the semi-official news agency ZIANA reports.

The deputy minister of information, posts and telecommunications, Dr Naomi Ndwapi, responding to points raised by senators during debate on the presidential speech, said the transmitter was functioning "well" and that other areas would be provided for during the 1987/1988 financial year. "All remote areas should be able to pick up ZBC radio and television and work in this direction is already underway," she said, stressing that SABC propaganda was creating a situation which could not be tolerated. The deputy minister said it was imperative from political, economic, and security points of view for Zimbabwe to dissociate itself from South Africa, hence the establishment of an international communications network. She said the process of "de-linking" had proved successful through the operations of the Amzoe earth satellite station and the Panaftel links with Botswana and Zambia. "Now that we are completing work on the external network our attention is focused on the domestic one," she said.

In addition to automising rural telephone exchanges, the posts and telecommunications corporation would digitalise urban stations and re-equip existing facilities. Dr Ndwapi also said 25 post offices would be built throughout the country by the end of 1990.

/9274  
CSO: 5500/11

LUXEMBOURG, FRANCE COMPETE OVER ASTRA, TDF-1 SATELLITES

Background on ASTRA, TDF-1

Paris LE MONDE in French 24 Jun 86 p 44

[Unattributed article: "The Battle of the TV Satellites: ASTRA Threatens TDR-1"]

[Text] The sky is darkening over Europe. Television satellites are locked in an economic and technological battle for viewers in 117 million homes. Seven years ago, France and Germany seemed to take a decisive lead in this competition when they began a large industrial project to produce a direct television satellite. TDF-1 and its German equivalent, TV Sat, were to provide a better alternative to the European telecommunications satellites (ECS) that were converted from their original purposes and used to distribute the first TV channels to reach across national borders (Music Box, TV 5, Sky Channel, etc). However, technical troubles and political uncertainties have meant long delays for the Franco-German project, which now faces daunting competition.

The first alarm came in 1984. An American businessman brought to the Grand Duchy of Luxembourg a proposal for the Coronet project, which involved a medium-power satellite capable of rivalling TDF-1. Pressured by European governments and industrialists who detected the Trojan Horse of American business and television, Luxembourg backed away from the deal. Two years later, Astra has come to replace Coronet. The satellite is still American, and the project has political support and a financial guarantee from the Grand Duchy, but the project's shareholders are European.

This time it will be difficult to do away with the competition, especially since Astra holds a handful of trumps. The viewer need only acquire a dish with a diameter of 85 centimeters (60 centimeters for TDF-1) in order to pull in 16 channels (to be raised to 32 in two years), as opposed to a maximum of five for TDF-1. Produced by small firms in Britain, Germany, and Scandinavia, the receivers will cost between 4,000 and 5,000 francs, a little more expensive than those being offered by Thomson and Philips for TDF-1. Astra also offers important advantages to operators: each channel rents for 37 million francs per year, compared to 100 million for TDF-1. Use of the MAC standard makes it possible to dub programs into six languages and to operate decoders remotely for pay television.

Above all, Astra is the first entirely private European satellite. "We have neither political nor industrial interests to defend," is the pointed comment of commercial director Marcus Bicknell. This little phrase hits the bull's eye when one recalls the reversals of fortune experienced by the candidates for a channel. Bicknell has been repeating these arguments in Madrid, Rome, Geneva, and London, in the course of a whirlwind tour of Europe to nail down orders before the planned launch date in 1987 (provided Ariane will cooperate). Astra's ambition is clearly stated: to become the hotbird, the celebrity satellite toward which the dishes of 30 million homes will point over the next 3 years.

To carry off its commercial tour de force, Astra must still clear its last hurdle: reaching an agreement with Eutelsat, the European space telecommunications organization. While satellites are free to beam down to earth without regard for national borders, creating growing numbers of links, the frequencies used to transmit television signals up to the satellite remain tightly controlled by government. It would be impossible to develop television by satellite if all European channels had to pass through Luxembourg to reach a broadcast point 36,000 kilometers up in space.

Eutelsat formerly opposed the Luxembourg project, treating it like a "paper satellite." Now it is involved in negotiations. The European organization is aware that it will not be able to give Astra any serious competition over the next 3 years at least. Its central concern will be to contain the ambitions of the Luxembourg project within the realm of television and to prevent forays into private telecommunications.

If Astra clears this last hurdle, what will be the future of TDR-1? This is the question that is currently being put to Telediffusion de France, to the Hotel Matignon, and to the Ministry of Culture and Communication. Some members of the government believe that the project is completely outmoded, and would like to limit TDF-1 to an experimental role while abandoning TDF-2 altogether. The prime minister's advisers, on the other hand, harbor doubts as to Astra's commercial success and point out that the German Government has not moved to distance itself from TV Sat.

However, the plan suffered a setback in the course of an initial interministerial meeting on 20 June. The bill under consideration would withdraw the authorizations granted to the consortium of Silvio Berlusconi, Jerome Seydoux, Robert Maxwell, and Leo Kirsch. The Ministry of Finance is refusing to support the scheme with public funds or to bump down the price of leasing channels as the preceding government had done. The 4 to 6 month delay in the launching of Ariane may provide some breathing space, but time is not on the side of TDF-1.

## Technical Aspects

Paris AFP SCIENCES in French 26 Jun 86 pp 28-29

[Article, author not given: "Luxembourg's Satellite Project Resurfaces"]

[Text] Paris--The Societe Europeenne de Satellite [SES, European Satellite Corporation], headquartered in Luxembourg, has visited a number of European capitals to present its Astra television satellite project, a competitor of the French direct broadcast satellite, TDF-1.

TDF-1 is a high-power TV satellite (230 W per channel) that will make it possible for any individual who installs a 60 cm satellite dish to receive four channels of programming directly. In the view of French technicians, it is the only technology that is currently viable for the development of television via satellite. Astra, which is manufactured in the United States by RCA, is closer, in its much lower broadcasting power (45 W per channel), to the present telecommunications satellites, EUTELSAT and INTELSAT (20 W per channel), which already offer the programs of approximately 15 channels to European cable networks equipped with a large enough antenna (a minimum of 1.80 meters in diameter). The first case involves a potential market of 100 to 300 million TV viewers; the second only several tens of millions.

The officers of SES--particularly commercial director Marcus Bicknell, who has thrown himself into a Europe-wide prospecting campaign--counter that the technology of the RCA satellite will enable its transmissions to be received by satellite dishes just 85 cm in diameter (not much bigger than those of TDF-1), which would make it possible in two or three years to equip 50 million homes in a rectangle covering nearly all of the countries of Western Europe at a cost equivalent to the price of a VCR.

This is serious competition for TDF-1, especially with Astra offering 16 channels compared to TDF-1's 4. Marcus Bicknell emphasizes that this will provide a much finer choice of programming, whether thematic (movies, sports, news, etc.) or regionally oriented (with Mediterranean, Scandinavian, Anglo-Saxon and other "axes"). As with TDF-1, the use of the new "MAC package" (which is to replace PAL and SECAM) will make it possible to broadcast each program in several different languages.

French technicians remain more than skeptical, emphasizing that in no case will the power of the RCA satellite allow for reception of high enough quality, and still less for the future development of European television, which is moving in the direction of "high definition." The project has appeared dangerous to the French Government, which, as soon as Luxembourg's intentions were announced two years ago, began a wide campaign against the Grand Duchy's satellite, then dubbed "Coronet," the chief promoter of which was American Clay Whitehead. The PTT minister at the time, Louis Mexandeau, denounced the "Coca Cola satellite" before the European public.

This "weakness" has been corrected, so that today the European Satellite Corporation has no Americans among its ten shareholders. Strengthened by a

financial guarantee from the Luxembourg Government, the company claims already to have received thirty letters of intent from candidates for one channel that it is offering for a lease price of \$5 million per year. TDR-1 and Astra are still inactive satellites stored in a hangar. The first one to be put into orbit has a good chance of carving out a lion's share of the European advertising market, especially if it puts forward attractive programs.

From this point of view, the French satellite is back to square one. The arrangements made by the Socialist government, which had planned to grant one channel to "The Five," another to cultural programming, and the last two to a private European consortium that includes Silvio Berlusconi and British magnate Robert Maxwell, has been denounced by Francois Leotard. Nevertheless, the government appears determined to send TDF-1 into space. An inter-ministerial council will ponder the matter in mid-July. An initial preparatory meeting of staff was held on 20 June, according to the Ministry of Culture and Communication.

The contretemps that have occurred in the sriane launch program should give the competitors more time to polish up their weapons. TDF-1 had been scheduled for launch in January 1987 and Astra in May. The new timetable for putting them into orbit will be available at the end of June. Both pieces of equipment will probably be delayed by several months.

13221/9274  
CSO: 5500/2716

## CYPRUS

### BRIEFS

RADIO COOPERATION WITH GREECE--The Cyprus Broadcasting Corporation [RIK] and Greek Radio Television [ERT] today signed a cooperation protocol opening new prospects in relations between the Cyprus and Greek radio and television networks. The protocol was signed after delegations from RIK, ERT-1 and ERT-2 held talks in Nicosia. Among other things, the cooperation protocol provides for efforts to improve the reception of ERT programs in Cyprus, exploration of possibilities for a joint satellite link, and broader exchanges of television and radio programs. The protocol also calls for the three organizations to introduce special programs on Cyprus and Greece and to grant television facilities to each other's correspondents so that matters pertaining to the two countries can be televised. [Excerpts] [Nicosia Domestic Service in Greek 1500 GMT 6 Sep 86] /9604

CSO: 5500/2402

## BRIEFS

MATRA, NOKIA SIGN AGREEMENT--Matra Communication and Nokia Mobira (Finland) announced the creation of a joint subsidiary in France, Matra Nokia Radiomobiles. The new company will produce French Radiocom 2,000 mobile telephones in Chateaudun. The new telephones will be marketed in France and to clients of other countries which have adopted French system specifications. The goal of the two partners is to pool their efforts in the mobile domain by using their respective research and development potential. The telephones will be marketed by the new subsidiary to diverse networks of retailers and installers under Matra Communication and Mobira brands. The communique stated that Matra Nokia Radiomobiles sales should reach 150 million francs in their first year, making them a leader in the French market. [Text] [Paris LES ECHOS in French 9 Sep 86 p 6] /8309

EUTELSAT COVERAGE ENLARGED--The television coverage zone of second-generation Eutelsat satellites, expected to be in orbit in 1989-1990, will be enlarged in order to secure a more solid position for the European Satellite Telecommunications Organization (Eutelsat) in the face of international competition in television transmissions during the next decade in Europe. The cost of these modifications will reach 5 million ECU for the first three satellites in the series, which will reach a total of eight. The contract with Aerospatiale initially represented 225 million ECU (more than 1.5 billion francs) for three satellites. With these modifications, each Eutelsat-2 satellite from 1989 on will be capable of furnishing as many as 16 television channels, which will be received by small-scale (more or less 1 meter) parabolic antennas throughout nearly all of Western Europe. [Text] [Paris LES ECHOS in French 9 Sep 86 p 14] /8309

CSO: 5500/2740

## EUROPE VIEWS FUTURE OF CONTINENTAL TELECOMMUNICATIONS SYSTEMS

### Italsat, Experimental Olympus Projects

Turin MEDIA DUEMILA in Italian No 7, Jul-Aug 86 pp 8-11

[Article by Italian Science and Technology Minister Luigi Granelli: "Up There, in the Satellites, the Key to Telecommunications:"]

[Excerpt] The Olympus Test Bed

Through its long-term decisions, Italy is participating in the development of the "Italsat" system, which is open to an incisive introduction into digital engineering, and in "Eutelsat," thereby gaining access to satellites, television channels, and emergency communications. These possibilities are broadened by the access to the rapidly expanding maritime telecommunications system, "Inmarsat," which will provide Italy with links from the U.S. Pacific coast to the Japanese coast.

But the real test bed, in terms of further national progress, is putting the Olympus satellite into operation by the end of 1987 or the beginning of 1988, taking into consideration foreseeable delays in space-related work. Through the experimental programs of this satellite, carried out by the European Space Agency [ESA] in which Italy has a 32 percent participation, experiments are being conducted on live television broadcasting, on modern communications systems and diffusion and on video conferencing. RAI already has signed a lease agreement with the ESA for exclusive use of a television channel on the first Olympus satellite flight. The Satellite Control Center at Fucino, which has a primary role at a European level, will play an important part in these experiments.

Participation in these challenging programs, which are made possible by the National Space Policy, by the standards reached by the scientific community and industry, and by the reorganization of public services in this sector, is the introduction both to the almost simultaneous development of a national satellite telecommunications network, centered on an extremely modern Italsat program, and the subsequent development of some Sarit satellites (Italian radio broadcast satellites) for live television broadcasting, which will involve

multiyear operational projects and will have a capacity of three to five television channels. Therefore, the logical development -- without delays or interruptions -- of these decisions is very important to Italy's future in telecommunications.

#### Development and News at National Level

The Italsat program, one of the most ambitious objectives of the national space plan, will permit, in the context of positive international cooperation, the "experimental-preoperational" development of a domestic telecommunications network with completely digital and integrated technology services. In fact, this is the only way to achieve dynamic, controllable, and potentially pluralistic management of the entire public network of the country. The difference in quality is of historic importance. This type of network, with a capacity equal to over 10,000 telephone circuits, is designed in perfect harmony with the long-term programs of the Ministry of Posts and Telecommunications. Its development also benefits from the mobilization of the best of the Italian scientific community, the most important national industries and some, albeit limited, foreign contributions of high strategic qualification. The preoperational nature of Italsat has recently suggested the simultaneous production of a second satellite based on a series of economic and financial considerations proposed this year during the updating of the National Space Plan. This new decision has several significant advantages. Should the first launch be unsuccessful, it guarantees the immediate availability of a second satellite without losing 3 years, that is, the time necessary to build a replacement. The damages and effects in light of current international competition would be significant. At the same time, producing two satellites simultaneously may also reduce costs.

The second satellite, which in any case is scheduled and necessary for the operational stage, could be put into orbit 6 months after the pre-operational testing, and go into operation saving time and expense. In light of the advantages derived from similar utilization, the affiliated companies concerned are in fact prepared to provide forms of reimbursement in excess of approximately 30 billion lire required for the production of a second Italsat flight unit. This obviously interesting proposal was also positively evaluated by the Executive Board of the Ministry of Posts and Telecommunications and will be examined more closely by CIPE.

Moreover, accelerating the development of a national satellite network also promotes the development of Sarit, a series of satellites for live television broadcasting, beginning in 1988, taking into account the experiments carried out with Olympus. By courageously following

this new path of development, which broadens into other operations of a modern integrated service, Italy can quickly reduce the serious lag in Europe and at the same time set ambitious objectives on the world market, especially in underdeveloped countries.

#### Completion of the Earth Segment

To complete the country's notable modernization effort, it is indispensable to ensure, in time, that the earth station at Scanzano, in the province of Palermo, is finalized and put into operation. By achieving this objective, the national "earth segment" will consist of three stations instead of just the two present ones at Fucino and Lazio. From a technical-economic point of view, this network would be better able to satisfy the demand to optimize the distribution of telecommunications traffic flow to and from the three major areas in northern, central and southern Italy. The ability to systematically and rationally control the medium and long-term development of the national network would improve. In fact, through satellites it will be possible in the foreseeable future to supply digital services in the field of broadband networks for business users and for increasing national and international traffic.

If these services are to be carried out more frequently by earth digital systems as foreseen by the modernization and development of our national system, it is indispensable that immediate systematic solutions be adopted to ensure a gradual, efficient and economical development of a network which integrates satellite and earth systems. The use of a national operational satellite, Italsat, thus becomes the focal point of an integrated system which can rationally and gradually develop without wasting resources, ensuring a positive overall vision, against the risk of partially accomplishing different program areas that would condemn these possible achievements to reduced productivity and to a fast and equally costly obsolescence.

The challenge is no small matter, but going halfway is tantamount to losing.

#### The Research Development Incentive

It is well known that the Italian Government for some time has been preparing an ambitious program for an extended and renewed telecommunications system which foresees expenditures of over 100 trillion lire, at present lire values, during the next 10 years. In this area the portion concerning satellites, including the new proposals and the suggested acceleration, far from being a step forward is fundamental to the achievement of the planned program.

If one thinks of the projected expenses, which involves the entire telecommunications manufacturing industry, the reorganization of public services in a harmonious mixed system, and the applicative activity of the telematic sector, one must make a final comment. An investment of such considerable dimensions requires adequate research and development support in order to achieve optimal results. For this reason, a proposal has been made, which has been examined by CIPE, that the minister for research be formally assigned the task of coordinating a specific plan for all the initiatives of basic and applied research finalized by industries and services whose objective is the development of telecommunications and related fields.

A tendency in this field to crush initiatives in order to maintain low cost levels would certainly have disastrous consequences. Financing from other industrial research in accordance with Law 46, some finalized CNR projects, and participation in European research initiatives (RACE, EUREKA, IRIS) is not sufficient to support an investment of over 100 trillion lire. The allocation of just 1 percent of such a sum for research costs would permit the establishment of an organized plan of both the current activities and those necessary for the future. However, these future projects, although worthwhile, lack funds. Putting pressure on an organized research and development effort in a highly competitive field, such as the one in progress for telecommunications, means taking into consideration a factor which is regarded as essential to the success of ambitious objectives even in the most advanced industrialized countries. And Italy cannot be an exception to this rule.

#### Problems for French Tdf1

Turin MEDIA DUEMILA in Italian No 7, Jul-Aug 86 pp 22-27

[Article by Antonella Tarquini: "That Satellite Has Become a Dossier;" first paragraph is MEDIA DUEMILA summary]

[Text] Even before being launched, Tdf 1 desired by Giscard d'Estaing and Mitterrand is weighed down by technical problems, rivalities and conflicting interests. And the change in government has now further complicated matters.

Paris. Theoretically, the live television satellite, proposed by Valery Giscard d'Estaing in 1979, and carried forward by Francois Mitterrand, should ensure France a place in the front line in those audiovisual "star wars" engaged in by major industrialized countries. But the winning weapon has turned along the way into a more and more complicated "dossier," weighed down by technical problems, rivalries and conflicting economic interests that threaten to continue and drag

on until the launch of the satellite, and beyond.

In the first place, things are not going too well technically. The satellite no longer presents solid guarantees; an essential part of its mechanism, the progressive wave tubes, has yet to be tested definitively. In particular, there is the problem of the supporting channels. Each satellite is equipped with six tubes; two are needed for each channel, one for broadcasting and one in stand-by. This means that to allow four channels to broadcast on Tdf 1, before Tdf 2 is sent into orbit, something will have to be sacrificed. One of the channels will constantly have a reserve tube, while in the case of breakdown the remaining three will have to depend upon a single reserve tube. This increase in risk will result in the reduction of the rental cost for these three channels, and this will mean lower earnings.

As regards the possible tenants of these so highly praised satellites, the situation is completely unclear. The struggle to "climb aboard" the satellite is fierce and the change of guard in the government has further complicated the situation. The new center-right wing majority led by Chirac misses no opportunity to undo the socialists' achievements and wants the audiovisual question to become a feather in their cap, promising to throw light on the question with the next approved legislation in this area. But the law, approved in June by the Council of Ministers and on which Parliament does not agree, has certainly not made clear who is to "climb aboard" the Tdf 1. The uncertainty is destined to remain for some time.

There are many contenders for the Tdf 1 channels: from the European consortium recently formed by Silvio Berlusconi with Jerome Seydoux, who is French, Robert Maxwell (English and owner of the Daily Mirror) and the German, Leo Kirch, to the Luxembourg television company, owner of the Rtl (Radio and Television).

But let us go back and retrace the steps in the satellite "race." At first, France allotted one channel to Maxwell, who wanted exclusive rights to the English language; a second channel was reserved for the French "cultural network" which should have been born from the project of Pierre Degraupes, (former president of 'Antenne 2'), but which seems at the moment to have been forgotten by a government more concerned with making the "historical network," Tdf 1, private and with taking "La Cinq" away from Berlusconi as soon as possible. The last two channels were to be allocated to "Clf", which wanted exclusive advertising rights on the satellite and the concession of a private French network which they could send by satellite, once in orbit. In October 1984, a protocol agreement assigned two channels to the "Clf", one in French and the other in German.

It is said that the "Clt" did not seriously propose themselves as candidates for the private network. It is also said that Mitterrand decided on a show of force, setting aside the commitments and promises made to Luxembourg in order to ensure himself a "socialist television" following the elections without realizing that his friendship with Craxi would not have been sufficient for Berlusconi to accept the risk of becoming involved ideologically.

The fact remains that the concession on November 19, 1985 of the first private French television network, "La Cinq," to Silvio Berlusconi and Jerome Seydoux did not meet with the approval of the "Clt." Luxembourg has been thundering menacingly, promising revenge and allying itself with French groups to compete for the allocation of the Tdf 1 and the "Cinq", ever since the configuration of the satellite completely changed.

In fact, the recent decisions of the Fabius government, just before the March elections, distributed the Tdf 1 channels in quite a different way: one to the "Cinq", (with the exclusive rights to the French); two to the European consortium, since Maxwell had abandoned the exclusive rights to English in order to join the consortium; the fourth and fifth channels (which would function only after the launch of Tdf 2) were left free. But the most probable allocation of these, up until the elections, seemed to be to the still hypothetical "cultural network" and the "Clt." The latter had, of course, been obliged to forego exclusive advertising rights and, as far as is known, has in reality asked for an option until July, reserving its choice between Tdf 1 and Tv-Sat. But the launch of the German twin scheduled for July has been postponed due to the well known problems with Ariane.

This "group" of the satellite's "tenants" corresponds more or less to that conceived, prior to Fabius' choice, by Jacques Pomonti, one of the major protagonists of this "audiovisual war" and above all one of the main promoters of the satellite's European role.

President-General Manager of INA (National Institute of Audio-visual Communication, which came into being after the reform of Ortf in 1975) Jacques Pomonti was charged by Fabius in December 1984 "to create a company for the exploitation of the satellite."

The tenants of this company (who would have paid 120 million lire annual rent for a channel) would also have been shareholders, and would at the same time have started up a real European production.

Pomonti set to work, looking for the right people, distributing the shares: 50 percent in French capital (34 percent to the state, 5 percent to Airspace, 5 percent to Credit Agricole and 6 percent to

other financial institutes), 50 percent in European capital, subdivided between Maxwell (20 percent), Berlusconi (8 percent) and Philips (5 percent); the remaining 17 percent was divided between two Luxembourg institutes. The initial capital of 30 billion was destined to reach 600 billion.

But unexpectedly the government changed its mind. Last November the minister of communications, George Fillioud, without consulting Pomonti, assigned the satellite channels to Maxwell and to the "Cinq"; the clauses regarding Pomonti's dream of the European production disappeared and Pomonti resigned, "believing his mission finished."

Pomonti still talks about "his" satellite with enthusiasm. "It is the most powerful in the world", he says. "Just think, it has a tube of 230-250 watts pointed towards earth." He is also worried about both the delays with Ariane and about the completely vague situation in which the "programs" aspect of Tdf 1 currently stands. "The market must be seized," he says, "before others arrive, the Americans for example. If we take it now, we can establish a relationship with the television viewers, and then the future live television satellites, Tdf 3 and Tdf 4, will be financed by those of the first and second generations." He goes on to say: "We must not miss this chance. Ours is a European satellite because it will cover almost all of Europe; in addition, it has one great advantage compared to the United States; we shall be able to produce live television because we do not have problems of time zones, as in America."

On March 13, three days before the elections, the Fabius government hastened to firm up the configuration of the satellite. "Telediffusion de France" signed an agreement with the European consortium for renting two channels. "Fortunately," we were told by Angelo Codignoni, representative of the Fininvest group in France, who has not missed even one round of the exhausting dealings, "Tdf' has realized that to calculate the cost of rental on only one generation of satellites, which will wear out in 7-8 years, is pure madness. We have convinced them that the only possible calculation should be on two generations of satellites. In this way we have been able to divide the cost per channel over 16 years, and we should start at 55 million lire for the first year, subsequently increasing the figure to 100 million lire." Codignoni adds: "We will have to start."

Everything that has been said until now runs the risk of remaining hypothetical. The new law put forward by the Minister of Communications (and of Culture) Francois Leotard, in fact, foresees the withdrawal of those authorization dates conceded by the former government for the use of the satellite. The "Clt" has great expectations for this law even though it has few programs, in the sense that to "fill" a live television satellite a large number of programs

of excellent quality are required, which also means a lot of money, to satisfy an extremely vast and demanding audience who will not be satisfied with local or regional productions, an audience upon whom the profitability of the satellite depends and who should be convinced by the quality to buy the expensive, parabolic antenna. These will be manufactured by Philips and Thomson, but as far as is known they have not yet been ordered because this continuous dance of "tenants" makes any market research or quantity forecast impossible.

Still on the hypothetical plane, the consortium would like to set up an information, sports and music channel in addition to dedicating another to international events, with a great deal of original productions. The consortium, according to the agreements signed before March 16, committed itself to broadcasting 18 hours a day, 70 hours of "fiction" in the first year and 100 in the second. This should present no problems, should they succeed in getting aboard the satellite, since the archives of Berlusconi, Maxwell and Kirch are rich in programs. Berlusconi's "European dream" seems in danger even though "His TV Excellency" remains optimistic.

To throw a cold shower on the weapon France would like to use to win her "star wars" comes Andrea Caruso, general manager of Eutelsat, the European organization of satellite telecommunications, which already has two satellites in orbit for the program distribution of the European cable networks, carrying ten channels, including RAI, Sky Channel, etc.

"The two satellites, Tdf 1 and Tdf 2 are nothing more than experiments. They are domestic satellites. At most they can be considered pre-operative satellites," says Caruso "because they are extremely expensive. Of course, one must take one's hat off to such advanced technology. But a satellite with only four channels is not economical. No satellite can survive under these conditions. And then again", Caruso adds, "the satellite is designed with transmission power that can hardly be received outside France. In the same way its twin Tv-Sat only illuminates Germany." In Caruso's opinion, in short, not one of the three European satellites (Tdf 1, Tv-Sat or Olympus) will be able to provide commercial, or in any case, profitable services, given the extremely high costs for development, manufacture and launching. The limited number of channels and limited area of coverage are insurmountable handicaps.

"What is needed is a satellite with real European coverage which can carry a large number of channels," Caruso continues. With this in mind, Eutelsat has projected a satellite with 16-20 channels, the Eurypsat, the production of which is currently under study by the European governments and which may be ready in 1993. This will be a

second generation satellite which will replace the Tdf 1 and Tv-Sat when these have finished their productive life in orbit. The costs will feel the effects of the economy of scale," says Caruso, "and the rental of a channel could cost a quarter of a Tdf channel -- from six or seven million ECUs a year per channel."

"Those who maintain that a satellite must have dozens of channels to be productive are simply being controversial, like those who say that the Tdf 1 will not cover all of Europe," said Jacques Pomonti when presenting the plan for "his" satellite. "Let us hope that sooner or later this satellite will become a reality."

#### Olympus, 'Sarit' Programs

Turin MEDIA DUEMILA in Italian No 7, Jul-Aug 86 pp 43-47

[Article by Giorgio Bogi, undersecretary of the Italian Postal and Telecommunications Services: "An All-Italian Space;" first paragraph is MEDIA DUEMILA introduction]

[Text] Targets and phases of the project drawn up by the Italian Ministry of Postal and Telecommunication Services for the preliminary operation of satellite TV. The first Italian satellite will also cover Switzerland, Austria, part of the FRG and France as well as other countries such as Yugoslavia, Greece and Tunisia.

Important undertakings are under way in Europe for the development of DDS (Direct Satellite Broadcast). In a few years, Italy will above all be able to receive programs from France and the FRG, which entered into a specific cooperation agreement in 1980 and expect to develop their first DBS system in 1986 with two orbiting satellites (and a stand-by one on the ground) for broadcasting four TV channels, in compliance with the specifications set by the World Administrative Radiocommunications Conference of 1977 (WARC-77).

The passage from the preoperative to the operative phase is expected for about 1988, at least as far as Germany is concerned.

Today, however, due to the recent accident with the carrier rocket Ariane, it is not unlikely that the dates set for the launchings, September 1986 for the German satellite Tv-Sat, and January 1987 for the French satellite Tdf-1, will be delayed a few months.

The two satellites will have the same orbital position assigned to Italy (19 degrees west) and their transmissions will largely cover the

Italian territory, as indicated by Figure 1 which shows the area of coverage assigned by WARC-77 to the various European satellites.

The European space agency (ESA) is carrying out the European experimental program L-Sat, now called Olympus, which foresees the launching of a multipurpose satellite (i.e. with instrumentation aboard allowing both DBS and telecommunications) at the end of 1987. This satellite will carry various transponders, including two for DBS in compliance with WARC-77, with the exception of the transmitted power, which is lower. One of the channels is reserved for Italy (which participates in the program with a contribution equal to 31.5 percent of the total cost of about 800 billion lire, while the other channel is reserved for member countries of the UER (European Broadcasting Association). This program is joined by eight member countries of ESA at different levels, i.e., Great Britain, Italy, the Netherlands, Belgium, Spain and Denmark (permanent members), Canada (assistant member) and Austria (associate member).

These initiatives involve immediate and far-reaching consequences from the technological, economic and social point of view, which will concern the aerospace industry, civil and specialized electronics, production and broadcasting of television programs, the introduction of new telematic services, and the advertising market, and which will affect the balance between the levels of development among European countries and, in a more general way, among the Western industrialized countries.

All of this, in compliance with what is indicated in the 1985-1994 national telecommunications plan, leads us to believe that the conditions are ready for drawing up a systematic plan for the preliminary operation in our country of a television broadcasting service from satellite.

The basic objective of live broadcast systems via satellite is to allow the users to directly receive better quality radio and television programs in general in comparison with those programs received by conventional ground systems. An innovative aspect of DBS, particularly relevant for European countries, is the supra-nationality of its broadcasts (without prejudice to agreements between states for the mutual "protection" from overflow) in the presence, however, of a cultural and civil homogeneity in the area involved.

With a high-level signal, the Italian satellite will cover, apart from our country, Switzerland, Austria, the southern part of the FRG, and, with double-polarization antennas, the southern half of France, as well as less attractive countries from the commercial point of view such as Yugoslavia, Greece and Tunisia (Figure 1a). The same figure also shows

the coverage of the satellites (Switzerland, Austria, the FRG) located in the same orbital position and irradiated with the same polarization as the Italian one and can thus be received by the same antenna. With the same antenna position, the French satellite can also be received (Figure 1b), but, because the irradiated polarization is different, the receiving equipment will be more complex than in the previous case (and, consequently, much more expensive, which will impact on broadcasts). With the same equipment and a second antenna it is possible to receive also Vatican City, Monaco and San Marino.

As we said before, the experimental premise already exists, and is based on the availability of a channel from the Olympus satellite.

The objectives of the plan studied by the Ministry of the Postal and Telecommunication Services can be summarized as follows:

- to assure a competitive Italian presence in the European context in the field of live broadcasts via satellite;
- to put the Italian professional space and electronics industry in a position to qualify on the international market, characterized by heavy competition;
- to offer the civil electronics industry the possibility to assert itself on the national market of receiving terminals, in time facing the competition of major multinational industries;
- to assure, at least partially, the return on considerable investments for research and development already carried out by Italy at a national and international level;
- to take part in the expansion and diversification in process concerning television consumers and, in general, the cultural, informative and entertainment programs;
- to promote the competitive development of the national advertising market, within a context characterized by a strong process of internationalization;
- to increase, over the long run, the spectrum of radio resources available not only for radio broadcasting, but also for telecommunication services on the ground, and in particular for the earth Vhf-band radiocar services.

The project is divided into two stages and covers the period from now until the year 2000.

The first stage anticipates an initial period of study and preparation, and the first part will be the launching of Olympus, expected by the end of 1987, beginning 1988. Obviously, also these two dates will be affected by the problems created by the carrier rockets.

The beginning of the pre-operational stage is set in 1988, when a single program will be broadcast from the satellite. The launching of the first Italian satellite for live broadcast, Sarit A (F1), with three WARC-77 channels is expected in 1989.

The first channel of Olympus (F1) will become stand-by in orbit. At this point it will be possible to transmit three programs.

The launching of Sarit A (F2), identical to the previous satellite, is expected in 1992, when the useful life of Olympus will be about to expire.

At this point, all three programs broadcast via satellite will definitely be operative.

During the second phase of the project, from 1993 on, it should be possible from the operating point of view to have high definition television (Hdtv) available.

In 1996, the useful life of Sarit A (F1) will expire, and Sarit B (F1) will be launched, the first satellite of the five channel series. At this point, five television channels are available, three are in stand-by in orbit. The stand-by capability would make it possible to carry out the pre-operative experiments for Hdtv (should suitable frequency switchings be provided aboard) by 1992.

In 1999, Sarit A (F2) life will expire, and the 5-channel Sarit B (F2) will be launched. From this moment on, all channels will have a stand-by in orbit. The Hdtv program will become operative.

The use of 3 channels during the first operating stage (1989-1992) is based on the premise of carrying out thorough experimentation and a full evaluation of the commercial and cultural development potentialities of the new service. Even if it is likely that the comprehensive overview defined by the technical, social and economic considerations of the plan retains its validity during the stages considered, the possible sudden acceleration of some particular technology due to favorable events could make it necessary to update the program. And this does not so much concern general trends, as it does the modularity in the space plan development and the schedules for introducing the most advanced radio-television services.

As an example, note that research on high definition television (Hdtv) has recently been very quickly accelerated, and therefore it is not unlikely that all Hdtv regulations, relevant production techniques, transport, broadcast and reception techniques will become available at the beginning of the 1990's. This development makes us think of the possibility of introducing this service already underway in the first phase of the DBS program in Italy, in order to greatly stimulate the interest in a positive return of the operation.

The Italian audience, already "saturated" with the quality of the programs offered, could in fact be sensitive to a major improvement in the quality of the reception.

On this point, there is a clear differentiation of objectives between the Italian market and the markets of other European countries. For the latter, in fact, DBS seems to depend, first of all on the demands represented by the amount of new program offers for a market which is lacking and only secondarily depends on the quality of the reception.

The schedules for the introduction of Hdtv and the relevant technical regulations are subject, however, to an intricate conflict which, under a technical appearance, covers real political, industrial and prestige interests.

This technical conflict is focused on the problem due to a "recommendation" of the CCIR (International Radio-communications Advisory Committee) regarding regulations on the production of high definition television programs. These regulations will in fact exert a considerable influence on the production of studio equipment for reception of Hdtv, an area which will involve a sales volume of billions within 10-15 years.

It is not easy to draw up forecasts regarding the development of the service with a high degree of reliability. In particular it is currently difficult to give firm values to the following variables:

- a) strategies of other European countries regarding operational schedules of DBS satellites; possibility of multilateral agreements among linguistically homogeneous areas on the production and broadcasting of programs; possible transfer to private citizens (even non-European) of channels via satellite for program broadcasting;
- b) strategies of industries, and/or public or private broadcasting corporations, European and non-European, interested in operating within the area served by the Italian satellite;

- c) strategies of national and European industries regarding:
  - technical broadcasting regulations at a European level;
  - policy of prices and of international agreements;
  - characteristics of domestic receiving systems (antenna diameter, polarization);
- d) national strategies concerning existing and future cable networks (for example in the FRG and in Great Britain) and their integration with the DBS system, which may considerably modify the specifications of potential consumers;
- e) broadcast of collective systems;
- f) attitude of consumers, whose purchase decisions are today difficult to forecast, both because they depend on the type of programs offered and because the usual market research techniques are poorly suited to make forecasts whose patterns and usefulness are ignored by the public.

#### Costs of the System

The total investments required by the system until the year 2000 come to about 1.2 trillion lire (1984 value) according to the plan which utilizes at first three-channel satellites, and then five-channel satellites.

The overall costs of technical service (that is excluding the cost of the programs) for the same period also amount to about 1.2 trillion lire.

The yearly cost for an operative channel, averaged on the whole period involved, will be 26.5 billion. By far the greatest concern, with regard to the technical costs, is the cost of the programs. The main program, the one which is most attractive to the public, has been estimated to have an annual cost ranging from 300-400 billion lire.

As for the problem of covering the expenses, it is possible to draw the following conclusions from an overview of the European satellite programs. The programmed satellites could bring an overall offer of satellite services far superior to that paid for through advertising revenues. Therefore, if one does not realize the considerable revenues obtainable by payment on the received program, or by special subscription fees to be paid by the users of the country running the television programs, upkeep of the overall project will represent a considerable burden for the state finances of some countries.

What are the causes of this phenomenon, apart from the commercial competition of the service? There are certainly different motives to the cultural "message", but the phenomenon can also be explained by the existence of some national interests which do not strictly correspond to the service in question, but are however connected to its development. As we said before, industrial motives (for example, interests related to the market of terminals and of satellites); acquisition and maintenance of updated technological knowledge in this field; participating in the competitive development of the advertising market in a framework characterized by a strong internationalization process; reassigning, to other services, over the long-term, the cost of frequencies used today for earth networks.

Other considerations can be added to these observations. Direct broadcast of satellites will have above all the characteristic of supranationality (sovraneazionalità), and consequently different types of audiences.

It is easy to foresee that some programs and news bulletins will be broadcast in many languages.

This is a delicate problem and a suitable commission has been proposed by the Ministry of Post and Telecommunication to study it.

Supranational broadcasting implies establishing a broad area, and consequently entrepreneurship (for example the coproduction of programs) which also has to be tackled. The public or private corporations operating in the television field will therefore have an obligation to remain on the largest markets with a different entrepreneurial point of view (and in fact, as far as Italy is concerned, we must say that both Rai and private broadcasting companies are already orienting themselves in this direction).

There is then another group of problems, represented by the necessary agreements between states in order to give uniform rules in matters of the transparent budgets, the dominance of enterprises, advertising, the protection of "minors", etc. This is a complex job which has to be carried out timely and with great precision.

Finally there are the problems relevant to the protection of national cultural originality, in the broadest sense of new European originality, which television by satellite will certainly help to create. In Italy this is a task that has to be considered related above all to the role and function of public broadcasting, in accordance with the right of private citizens to have access to the satellite.

NEW LAW REPORTEDLY TO LIBERALIZE TELECOMMUNICATION SERVICES

Madrid EL PAIS in Spanish 10 Sep 86 p 20

[Article by Jose F. Beaumont: "The Government Liberalizes Telecommunications Services, According to Minister Abel Caballero"]

[Text] Madrid--The Law on Regulation of Telecommunications (LOT) will make possible the progressive liberalization of these services and the updating of the Spanish legal framework to the European system. This is the idea that is maintained by Minister of Transportation, Tourism and Communications Abel Caballero at the end of the social debate on the draft of the law and with respect to the meetings on the future of telecommunications in Europe that begin in Madrid today. Industrial and professional sectors have, however, made some objections to the contents of the LOT draft.

The ministry has concluded the period of external--industry and professionals--consultations on this law and in coming days it will be studied in the pertinent agencies of the administration before going to the Council of Ministers. "In any case, I expect the law to be approved before the second half of 1987 because, given its importance, it requires no fewer than 6 months for processing," said Abel Caballero.

The LOT will mean, in the opinion of the professionals of the telecommunications sector, the first serious attempt to place not only the world of telephony, radio broadcasting and television in order, but also that of construction and use of the most advanced technologies that today are increasingly joined with telecommunications with greater acceptance among users.

The sector of new technologies joined to communications--digital signal process, optical fibers, integration of microelectronic components and links by cable and satellite--is becoming the most important economic and technological sector of the European Community and occupies a very prominent place in countries leading in these matters such as the United States and Japan.

According to the minister of transportation, tourism and communications, the draft law "has been well accepted" among the sectors consulted and "some of their suggestions have been reasonable." As far as Abel Caballero is

concerned, "The system of monopoly can no longer be continued and it is necessary that the sector be liberalized, or that which is the same thing, that the state sector demonstrate a great flexibility and link up with the private sector, which is the one that dominates data processing, for example."

One of the most difficult questions dealt with by the draft is the change in the contract with the Spanish National Telephone Company, a private company that practically has a monopoly of telecommunications. "The present contract," says Abel Caballero, "is obsolete and the law establishes the bases for a new contract. The administration shall be responsible for making telecommunications policy and the telephone company will be required to have a greater clarity of operations. It is not good, for example, that the company, as a monopoly, have the right of approval on terminals."

Another aspect of the draft, which for some specialists is not developed enough, is that which refers to the unification of the transmission network. Abel Caballero admits that the network cannot be unified with a pen stroke, "but it can operate openly with the users, including those of private television, as a single network coordinated by the state."

The minister points out the importance of having the law refer to the National Telecommunications Plan, which is already being prepared and which has a period of execution of from 8 to 10 years.

"This plan seeks to define all the activities of services, forms, establishment of networks and the coordination of the telephone company, postal service and television plans," adds Caballero.

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TELEFONICA ISSUES CONDITIONS FOR ITT, CGE PROJECT

Madrid EL PAIS in Spanish 4 Sep 86 p 40

[Article by Pedro Cases: "Telefonica Conditions its Participation in the Merger Plans between ITT and CGE"]

[Text] Participation of the Spanish National Telephone Company (CTNE) in the European telecommunications holding company, EUROTEL, is not yet certain despite the fact that the Spanish company has committed itself, through an agreement of intentions, to take a share of 7 percent of EUROTEL, with an investment of 40 billion pesetas. The Ministry of Economy, and Telefonica, have modified their initial positions, going from a complete support of the project, which resulted from the merger between the French company Compagnie Generale d'Electricite (CGE) and the U.S. company, ITT, to a position of "skeptecism."

At this time, Telefonica experts are preparing a viability study on its participation in this project, which could be concluded at the end of this month of September. Once this plan is studied, the government will authorize or refuse participation of Telefonica in the project.

The reservations by the Ministry of Economy continue to focus on the complexity surrounding the large financial investment required in the operation--specifically \$300 million in capital--although Telefonica sources assert that "after having had several meetings with the banks that work with the company there is already a preliminary design of the 'financial engineering' this operation calls for, although its scope cannot yet be revealed."

The change in the initial position of Telefonica--"Now we are waiting for them to convince us," declare company sources--is due to the changes undergone by the project since its initial proposals. Although it is not being used as a determining factor, the change that has taken place this summer in the percentage of majority shares in EUROTEL could be used by Telefonica to justify its definitive withdrawal from the project "because of the change in the agreements." With the aforementioned change, CGE has pledged to take a share of 60 percent of the European telecommunications holding company, instead of the previously agreed upon 70 percent (Telefonica was to underwrite 10 percent of that total)--and ITT would remain with 40 percent, with a right by the French company to buy the remaining 10 percent [as published].

Although officially Telefonica has ratified its interest in the project throughout the meetings held with the French this summer, Spanish negotiators have issued the message that participation will be conditioned on compliance with three basic points. The first of them is that Telefonica will only participate in EUROTEL if it is a European project and not only a French project. Participation in the project by the Societe General de Belgique (SGB) -- it has committed itself to take a 10 percent share that corresponds to the CGE--sponsored by former European Commissioner Etienne D'Avignon, would not mean, according to the Spanish negotiators, that the project would lose its French nature.

The second requirement, which together with the foregoing has the "characteristic of state," is that participation by Telefonica should mean the sale to EUROTEL of 21 percent of the shares it has of the ITT affiliate, Standard Electric, as well as its shares in Marconi. It is foreseen that negotiations will begin next October for trying to achieve a second reconversion plan for both Spanish companies, one of whose thorniest aspects is that of the reduction of payrolls, which could affect, according to experts of the sector, some 5,000 workers. Together with these two requirements, the Spanish negotiations have posed the need for Telefonica to have a greater specific weight in the new European corporation than that which accrues to it because of its holding of shares. Telefonica justifies its request by the fact, that of the two partners who have committed themselves, only the Spanish company is an operator, while Alcatel of the CGE is a producer and the Belgian SGB is exclusively a financing organization. The new position by Telefonica has led to a change in the strategy of the French negotiators. Specifically, on the 11th, the minister delegate of French telecommunications, Gerard Longuet, will travel to Spain to discuss this subject. The visit by Pierre Suard, president of CGE-Alcatel, is also expected some time in September.

It is precisely the decision by the French Government to replace former CGE-Alcatel President George Pebereau (who signed the merger of the French company with ITT President Rand Araskog), as well as the decision to return the French telecommunications consortium to a private status, that has been considered by Spanish negotiators as a substantial change in the proposals for the project. On the other hand, some overall aspects of operations still remain to be negotiated, such as the financing of the costs of restructuring EUROTEL, which amount of \$600 million, according to the viability plan that has been prepared this summer. To this amount another \$250 million should be added to be considered under the heading of "complements."

#### Expansion of Capital

The solution that appears to be the most advanced, and which it is supposed will be explained to Telefonica in the visits it will receive this month, is that of approving a capital expansion of \$700 million for the entire group, of which Telefonica would have to underwrite some \$50 million--6.7 billion pesetas. If this expansion is carried out, probably in 1987, and if finally Telefonica participates in the project, the Spanish company would face an overall expenditure of nearly 47 billion pesetas.

TURKEY

TELEPHONE LINES EXPANDED IN ISTANBUL

Istanbul MILLIYET in Turkish 4 Jul 86 p 11

[Text] Minister of Communications Veysel Atasoy has put three telephone exchanges into operation in Istanbul. In a speech given to mark the inauguration of the 15,000-line Bahcelievler, Istanbul exchange, Atasoy said that great importance must be placed on communications in order for Turkey to be able to take its place among the nations of the world.

Atasoy stated, "Communications is the most significant development in the areas of industry, trade, and tourism, which create economic structure. Since it came into office, our government has placed emphasis on communications. Communications followed energy in the preliminary plan of investment programs."

Minister of Communications Atasoy, who noted that Istanbul bears distinctive importance because it is an economic and trade center, reported, "It is our goal to bring the highest level of telecommunications services existing in the world to Istanbul. For this reason, we developed a separate working group."

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## BRIEFS

**SECOND CHANNEL BROADCAST IN OCTOBER**--The Turkish Radio and TV Administration's Channel 2 television will be inaugurated on the first Monday in October with a broadcast from the Ataturk Cultural Center and the Istanbul studios. Channel 2 programming, which TRT Director Tunca Toskay described as "giving the Turkish public a choice," will concentrate on culture and the arts. According to some circles, Channel 2 "will keep Channel 1 on its toes." [Excerpts] [Istanbul CUMHURIYET in Turkish 27 Aug 86 p 4] 8349

**ATT-PHILIPS TO SUPPLY COAXIAL CABLE**--Ankara (DUNYA)--A group composed of the U.S. firm ATT [American Telephone and Telegraph] and the Dutch firm Philips won the contract advertised by the PTT [Post, Telephone and Telegraph Administration] to supply coaxial cable. This concludes the purchase of digital line equipment advertised some time ago under the PTT's Baykok Project. The contract will reportedly be signed by the U.S.-Dutch group in the next few days. The ATT-Philips group offered the lowest bid of the five firms bidding on the contract for coaxial cable with 7,680 telephone channels at 565 MB/S and 1,920 channels at 140 MB/S. The U.S.-Dutch group bid a total price of 25.4 million Dutch florins, while West Germany's Siemens bid DM26.6 million. In the open bidding, in which the West German firm and the U.S.-Dutch group participated, ATT-Philips twice made 5-percent reductions. The group's final price was approximately 21 million Dutch florins. [Text] [Istanbul DUNYA in Turkish 26 Aug 86 pp 1,9] 8349

**NEW AUTOMATIC TELEPHONE EXCHANGES**--While putting one new telephone exchange after another into operation, Minister of Communications Veysel Atasoy has been unable to reach Gumushane Province by phone for 15 days. Citizens who dial the Gumushane Province capital's area code, 091, for hours are only able to speak through an intercity service and after a very long wait. PTT [Post, Telephone, and Telegraph Administration] officials explained that there is a defect in the Gumushane provincial capital's exchange and that the automatic area code cannot be dialed. Meanwhile, five additional automatic telephone exchanges have been put into service, bringing the number to 384 with a telephone line capacity of 2,379,750. The new exchanges are Balikesir/Savastepe, 6771; Corum/Mecitozu, 4695; Balikesir/Narli, 1977; Usak/Esme, 6414; and Usak/Karahalli, 6417. [Text] [Istanbul MILLIYET in Turkish 13 Jul 86 p 13] 11673